

From Theory to Practice:
Empowering Teacher Agency and
Confidence through Cross-Sectoral
Communities of Practice to
Implement Universal Design for
Learning.

A thesis submitted for the award of Doctor of Philosophy

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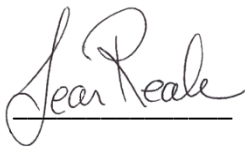
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Summary

This mixed-methods Design-Based Research (DBR) study, conducted in the academic years 2021 to 2023 with 29 educators across primary, post-primary, and further education levels within an Education Training Board (ETB) in southern Ireland. Investigated the effectiveness of a cross-sectoral Community of Practice (CoP) combined with targeted professional development (PD) in enhancing teacher agency and capacity to implement a Universal Design for Learning (UDL) model within the participants unique learning environments. Additionally, it assessed the impact of the UDL implementation model on improving educators' ability to proactively address learner variability and diversity. By examining participants' perspectives on inclusive practices, their understanding of UDL and technology, and their roles in designing and applying UDL interventions, the study sought to measure the transformative potential of collaborative professional learning environments in advancing UDL implementation. Rooted in the constructivist interpretative paradigm, this study emphasises the social construction of knowledge through real-world interactions and reflections. DBR was chosen to align with this paradigm by iteratively developing and refining interventions based on practical feedback and contextual realities (Barab & Squire, 2004). Brown (1992) posited that effective educational interventions must transition from experimental settings to real-world classrooms. DBR facilitates this transition through its iterative and context-specific approach, ensuring practical applicability and relevance.

The study examines the evolution of inclusive education theory, tracing historical developments and current practices. It explores how inclusive education has been shaped by past theories and policies, influencing teachers' attitudes, understanding, and agency in inclusive practice. Inclusive education, recognised as a cornerstone of contemporary educational philosophy, advocates for equitable access and support for all students. This principle is supported by international frameworks such as the UNCRPD (2006), Agenda 2030, and the Salamanca Statement (UNESCO, 1994), which emphasise the importance of inclusive schools in combating discrimination and promoting education for all.

The study situates UDL within the broader literature on inclusive education, demonstrating its potential as a transformative framework that empowers educators to design inclusive learning environments. Despite UDL's recognised potential, gaps remain in the literature regarding its practical implementation and efficacy across various educational settings (Edyburn, 2010; Rao et al., 2014). This study addresses these gaps by providing empirical evidence on the effectiveness of CoPs and professional development in advancing UDL implementation. Utilising a QUAL + quan mixed-methods approach DBR proved particularly effective for investigating complex, real-world educational issues and developing practical solutions through iterative testing and refinement in collaboration with practitioners.

The findings reveal that cross-sectoral CoPs are powerful tools for fostering professional growth, collaboration, and teacher agency across different educational sectors. The CoP facilitated the sharing of diverse perspectives, the adoption of innovative practices, and the enhancement of inclusive teaching strategies. Theoretical frameworks such as Bronfenbrenner's Ecological Systems Theory, Vygotsky's Sociocultural Theory, and Bandura's Social Cognitive Theory were employed in the study design and highlight the critical role of social interaction and collaboration in professional development. Participants reported increased confidence, enhanced agency, and improved application of theoretical knowledge in their practical settings. However, challenges in sustaining these benefits over time and across various contexts were identified, highlighting the need for ongoing support, adequate resources, and systemic integration. This study highlights the necessity of a balanced approach to professional development, combining the collaborative strengths of CoPs with critical reflection and systemic support. Such an approach can cultivate a unified culture of learning and development that enhances teacher efficacy and agency. Future research should address identified challenges and explore avenues such as longitudinal studies, in-depth case studies, evaluations of teacher education programs, technology integration, and parent and community engagement. Additionally, policy development and international comparisons could further enhance understanding and improvement of UDL and CoP practices, contributing to more accessible and equitable learning environments.

Abstract

The literature highlights a critical need for practical, classroom-level guidance on effectively implementing Universal Design for Learning (UDL). Researchers such as Edyburn and Edyburn (2015), Ok et al. (2017), and Rao et al. (2014) emphasise this necessity, while Edyburn (2010) points to the lack of primary research on UDL and its implications. This absence of a strong empirical foundation makes it challenging to validate UDL as an effective educational intervention, highlighting the need for studies that provide actionable strategies for educators. Additionally, another significant gap pertains to the role of teachers in implementing UDL. While Spencer (2011) and Vitelli (2015) acknowledge the importance of the teacher's role, this area remains understudied.

This mixed methods design-based research (DBR) study addresses these gaps by exploring the effectiveness of a cross-sectoral community of practice (CoP) combined with targeted professional development (PD) in enhancing teacher agency and capacity to implement UDL across primary, post-primary, and further education (FET) settings. The study also examines the impact of a collaboratively designed UDL implementation model on improving educators' abilities to proactively address learner variability and diversity. By analysing participants' perspectives on inclusive practices, their understanding of UDL and technology, and their roles in designing and applying UDL interventions, the study evaluates the transformative potential of collaborative professional learning environments in advancing UDL implementation.

The findings revealed significant improvements in participants confidence, agency, and ability to apply UDL principles in practical classroom settings through active participation in the CoP. However, challenges remain in sustaining these benefits over time and across different educational contexts. While CoPs offer a promising model for professional development, their long-term success will depend on ongoing support, adequate resources, and their integration within broader educational systems.

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Finally, if I could speak to my 18-year-old dyslexic self, who was told she needed to know her limitations, I would say:

To those who ground me

Take a message back from me

Tell them how I am defying gravity

I'm flying high, defying gravity

And soon, I'll match them in renown

And nobody in all of Oz

No wizard that there is or was

Is ever gonna bring me down

(Defying Gravity from the Musical Wicked)

Le buíochas ó chroí libh go léir

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List of Acronyms

CAST	Centre for Applied Special Technology
CoP	Community of Practice
CRC	United Nations Convention on the Rights of the Child
CRPD	United Nations Convention on the Rights of Persons with Disabilities
DBR	Design Based Research
ESD	National Strategy on Education for Sustainable Development
EPSEN	Education for Persons with Special Educational Needs Act 2004
ETB	Education and Training Board
FE	Further Education
FET	Further Education and Training
ICT	Information and Communications Technology
NCCA	National Council for Curriculum and Assessment
NCSE	National Council for Special Education
NDA	National Disability Authority
PD	Professional Development
SEN	Special Educational Needs
SENO	Special Educational Needs Organiser
SEND	Special Educational Needs and Disabilities
SDG	Sustainable Development Goals
SIM	School Inclusion Model
SNA	Special Needs Assistants
UN	United Nations
UDL	Universal Design for Learning
UDL_IRN	Universal Design for Learning Implementation and Research Network
UDL RC	Universal Design for Learning Reporting Criteria

RACE	Reasonable Accommodations at Certificate Examinations
UN	United Nations
UNCRPD	UNCRPD
UNESCO	United Nations Educational, Scientific and Cultural Organisation

Chapter 1 Introduction

1.1 Personal Statement

I have always been deeply committed to inclusive education, dedicating my career to creating opportunities for those who are educationally marginalised. This dedication is rooted in my personal experiences as a dyslexic student and academic, which have provided me with firsthand insight into the barriers inherent in our current educational system designs. Over the years, I have developed strategies that work for me both professionally and personally, benefiting greatly from advancements in educational technology and the flexibility it offers for accessing and creating knowledge.

My personal journey has profoundly shaped my teaching practice. I prioritise offering choice and flexibility to my students, encouraging them to share their voices and learning experiences, and helping them understand that learning is as unique as a fingerprint. By embedding this philosophy into my teaching, I naturally adopted the principles of Universal Design for Learning (UDL) long before I became aware of it as a formal framework. My research eventually led me to the significant UDL movement in the United States, sparking my interest in developing UDL practices within an Irish context.

With over 25 years of experience as an educator and educational technologist across both public and private sectors, I have consistently focused on creating inclusive learning environments and leading the adoption of technology for learning. However, I have also witnessed considerable disparities in skills and resources across our primary, post-primary, and tertiary education systems. The Digital Learning Framework (2015, p. 3) acknowledges that schools are at different stages of integrating digital technologies into teaching and learning, while the Digital Strategy for Schools to 2027 emphasises that digital technologies can promote inclusiveness and support UDL principles.

The academic years from 2020 to 2023 exacerbated these disparities, as the emergency pivots to online learning tested every member of our learning communities. However, these challenging times also revealed the crucial role of flexibility and choice, supported by everyday technology, in aiding all learners. The Digital Strategy for Schools to 2027 highlights the valuable

lessons learned from the challenges posed by COVID-19, particularly praising the remarkable innovation and ingenuity shown by school leaders and teachers who used technology in new ways to support student learning. It is my view that it is essential to sustain the momentum gained during COVID-19 in adopting digital technology to create more flexible and accessible learning environments for all.

The shift to online learning compelled teachers and learners to engage with UDL principles, such as providing multiple means of engagement, representation, action and expression, which revealed new and exciting opportunities. Since March 2020, I have been approached by numerous teachers, principals, and education centres seeking guidance on how to leverage the technology skills and flexible learning strategies developed during the pandemic for everyday classroom practice. This growing interest in flexible learning and UDL implementation at both the whole school and classroom levels has inspired me to design this study.

Having started my PhD journey in 2019, I like the rest of the world could not have envisaged the catastrophic changes the Covid-19 pandemic would impose on every aspect of our lives. The rule book for living was replaced by a draconian rule book for surviving, or as Azorín (2020) describes it, the Covid-19 supernova. Where our ability to go about our daily lives was curtailed, our right to freedom of movement and to the practice of social, cultural, educational, and religious rituals were forbidden. By the time this PhD is completed a lot of the traumas both personal and professional will have been lost to a form of COVID-19 amnesia. That's why it is important at the outset of this thesis to remember the monumentally difficult experiences we have had and the loved ones we have lost. To acknowledge the extraordinary contribution educators at all levels of the Irish education system have made to ensuring the continuity of teaching and learning through the turbulence and uncharted waters of the emergency pivots to online learning and especially to the 29 educators who embarked on this journey of learning and discovery they are true "UDL champions".

1.2 Research Context

This Design-Based Research (DBR) study, conducted over two academic years from 2021 to 2023 with a cohort of 29 educators, utilised a structured two-phase approach to advance UDL implementation by focusing on enhancing teacher agency.

In phase one year one, the study concentrated on fostering teacher agency through the development of a cross-sectoral Community of Practice (CoP) and targeted professional development (PD). This approach is grounded in Wenger's (1998) framework of CoPs, which highlights the significance of social learning and collaboration in professional development. By engaging educators from primary, post-primary, and Further Education and Training (FET) sectors in Ireland, the study aimed to build a supportive network that facilitated collaborative engagement with UDL principles (Hoadley, 2022). The targeted (PD) provided within the CoP was designed to empower teachers, reflecting the emphasis on teacher agency as crucial for effective educational reform (Day & Sachs, 2004).

In phase two year two, the study built upon this foundation by assisting participants in designing and implementing UDL interventions within their specific teaching contexts. This phase aligns with the iterative nature of DBR, which emphasises ongoing refinement and practical application (Barab & Squire, 2004). By supporting teachers in applying UDL principles, the study not only aimed to solidify their theoretical understanding but also to ensure the practical relevance and effectiveness of the UDL interventions (Design-Based Research Collective, 2003). This iterative, context-specific approach emphasises the study's commitment to generating actionable insights and scalable practices in UDL implementation.

1.2.1 Impact of Covid-19 pandemic

In 2020, the COVID-19 pandemic caused a profound transformation in global education systems, compelling schools and teachers to rapidly adapt to remote and flexible learning environments and resources, while placing unprecedented demands on all stakeholders. This crisis not only emphasised but also deepened existing social divides and systemic inequalities within education systems worldwide (Purcell & Lumbreras, 2021; Czerniewicz et al.,

2020; Darmody et al., 2021). The displacement of 1.6 billion learners from face-to-face environments across 193 countries (UNESCO, 2020) highlights the extensive impact of this disruption.

The literature demonstrates that the COVID-19 pandemic drove immediate and unexpected changes in educational practices worldwide, challenging the traditionally slow process of change in schools (Gardner & Ollis, 2015). The sudden shift to online learning environments necessitated the adoption of unfamiliar teaching and learning pedagogies, methodologies, technological tools, and resources, fostering new thinking on learning and access to learning.

The pandemic dramatically highlighted the crucial role of flexibility and technology in ensuring the continuity of education when traditional education systems faced unprecedented barriers to access. This shift underscored the need for multiple access points and increased flexibility within the education system to support the diverse learning needs of all students, not just those traditionally marginalised by inflexible, fixed system design. These barriers mirror the historical disadvantages faced by disabled students, thus broadening the scope of accessibility issues to encompass all learners.

The issues of environment and learning design were widely called into question when traditional tools used to access learning and resources were replaced by technological devices and skills. The transition revealed that students' learning abilities were limited by poor design and lack of resources, highlighting significant disparities in access to digital devices and broadband, which disadvantaged some students who were previously successful in traditional settings (Aucejo et al., 2020). This aligns with Universal Design for Learning (UDL) principles, where Rose and Meyer (2002) argue that learning barriers stem more from rigid educational materials and methods than from inherent student limitations, aligning with Rummler (2004) insight that systemic flaws overshadow individual potential.

The COVID-19 pandemic has brought to light the inherent limitations of traditional learning environments and their potential to be disabling if not purposefully designed. The need for a redesign of education systems to overcome both pre- and post-pandemic barriers is evident. Basham et al.

(2020a) argue that design is directly associated with outcomes, emphasising the importance of intentional design in creating inclusive and equitable learning environments. The pandemic has provided a unique opportunity to re-evaluate and innovate educational practices, ensuring that all students, regardless of their background or abilities, have access to quality education.

Azorín (2020), suggests that the post-pandemic schooling universe has two possibilities open to it: a return to traditional education as usual or a transformation towards another education.

Ladson-Billings (2021) argues that returning to 'normal' in the post-Covid-19 period would be a mistake, as it often reinforces educational inequities. This period offers a chance to reimagine education and create a system that prioritises inclusivity and justice.

The aspiration now is that by leveraging technological advancements and reimagining traditional educational models, stakeholders can collaborate to develop a more inclusive and resilient education system. This is the context in which this study was designed, aiming to explore the potential of UDL as an inclusive educational framework in creating a post-pandemic educational landscape that prioritises equity and accessibility for all learners.

1.2.2 Study Landscape

The concept of inclusive education has evolved significantly over the last four decades, becoming a fundamental principle in contemporary educational practice. Historically, inclusion focused primarily on individuals with disabilities and learning challenges, as extensively documented in scholarly literature and legislative frameworks (Florian, 2008). However, in recent years, the concept has expanded to include those at risk of marginalisation due to socio-economic status, ethnicity, language barriers, and other factors (Ainscow et al., 2006). Slee (2001) advocates for a broader perspective on inclusion, urging consideration of all forms of educational exclusion to better understand and meet the needs of inclusive schools in the future. This broader perspective emphasises the need for strategies that address barriers to learning and participation while ensuring resources are equitably distributed.

Florian and Black-Hawkins (2011) highlight the broad acceptance of inclusive education as a process of increasing participation and decreasing exclusion from the culture, community, and curricula of mainstream schools. Despite this, the theoretical foundations in special and inclusive education have faced criticism for their lack of coherence (Florian, 2014a). Florian (2010) argues for a shift in focus from specialised interventions for individual difficulties towards a more inclusive approach that strengthens the learning environment for all students, acknowledging individual differences while extending the benefits of existing resources.

Developing inclusive learning environments is a multifaceted process requiring state support for schools to implement inclusive strategies for students with disabilities. National and international policies and guidelines, such as the UNESCO Salamanca Statement (UNESCO, 1994), the UNCRPD (2006), the Incheon Declaration (UNESCO, 2015), and the EPSEN Act (2004), aim to ensure full access to mainstream education, promoting an inclusive orientation as the most effective means of combating discriminatory attitudes and creating inclusive societies. However, there is significant divergence in methods for achieving inclusive education at national and local levels, influenced by unique historical contexts, competing interests, and varying priorities (Smyth et al., 2014).

Ireland's approach to inclusive education has a complex history. Since 1990, government policy has shifted from segregated education for specific disability categories towards a more inclusive model integrating students with learning needs within mainstream classrooms (Shevlin & Banks, 2021). The Irish Government's ratification of the UNCRPD in 2018 reflects a formal commitment to inclusive education, yet integrating special education within this framework presents ongoing challenges. The Second National Strategy on Education for Sustainable Development (ESD) to 2030 emphasises principles of social justice, equity, and respect for human rights, aiming to foster engaged citizens motivated to pursue sustainable futures (UN, 2021). Despite these comprehensive strategies, practical challenges persist in aligning special education within the broader ESD framework (Allan, 2023b; NCSE, 2011).

Recognising the limitations of traditional approaches, Ainscow (2007b) advocates for an "inclusive turn" aimed at dismantling systemic barriers. This approach aligns with the principles of Universal Design for Learning (UDL) by Rose and Meyer (2002), who argue that learning difficulties often arise from inflexible materials and methods. As Griful-Freixenet et al. (2017) note, the most significant barriers to academic success for students with disabilities relate to the current established model of 'identify, label, tutor and accommodate,' which aims to provide optimal access to the general curriculum (Finn et al., 2001). Additionally, LaRocco (2013) and Oliver (2013) argue that diversity presents pedagogical challenges and opportunities that extend beyond mere accommodations.

Current stakeholders are recognising that the concept of inclusion, as it is currently framed and articulated, is vague and fragmented, leading to theoretical confusion (Ainscow, 2020). De Bruin (2022) argues that evidence accumulated over several decades across various policy settings indicates that students with disabilities achieve better academic outcomes when educated in regular education settings. Consequently, De Bruin (2019) suggests that it is time to shift the conversation from debating the necessity of including students with disabilities to focusing on how to achieve this inclusion on a larger scale.

A key consideration within the inclusion debate is the role of the mainstream class teacher. According to Florian (2008), teachers possess the skills to educate students with diverse needs. However, a lack of confidence in their abilities can hinder their effectiveness. Therefore, it's crucial to address this by dispelling the misconception that teachers require specialised qualifications to teach students with Special Educational Needs (SEN). Allan (2023b) emphasises that assigning expert status to special needs teachers and SENCOs leads to unrealistic expectations from mainstream teachers and management, further entrenching the special education paradigm. Thomas et al. (2006) argue that successful inclusion hinges on mainstream teachers assuming responsibility for inclusion and being confident in their capacity to educate students with special educational needs. There is an increasing awareness of the growing diversity among school populations worldwide, prompting calls for all educators to be prepared for inclusive education. This call is reflected in

UNESCO's (2017) policy directives on inclusive education and in recommendations from supranational bodies such as the European Commission (2018). To develop knowledgeable and skilled teachers in special educational needs, a whole-school approach is essential, as recommended in Ireland's further and higher education sectors (Quirke & McCarthy, 2020). Effective inclusive education requires more than just knowledge and skills; it necessitates that teachers have the agency to experiment, reflect, and adapt their practices to meet diverse student needs. Teachers' belief systems and self-efficacy are critical in implementing inclusive practices (Bandura & Wessels, 1997; Leko et al., 2015).

Despite theoretical and policy advancements, there remains a discrepancy between inclusive policy and real-world practice. Ireland's journey towards inclusive education has reached a critical juncture, requiring a paradigm shift from a deficit-based model to a systemic approach. Incorporating UDL and systemic reform has the potential to close the attainment gap and foster true inclusion. Ainscow et al. (2006) suggest that inclusion should be viewed as a dynamic, ongoing process evolving in response to emerging educational needs and societal changes. Continuous adaptation and responsiveness in educational practices are essential to cater to diverse student needs. As UDL gains momentum in the Irish education system, there is a growing need for relevant research within the state education system.

As with all significant policy changes, advancing inclusion and equity necessitates an effective implementation strategy. Specifically, it calls for innovative thinking that highlights the barriers some students face, which lead to marginalisation due to contextual factors like unsuitable curricula, inadequate forms of assessment, and insufficient teacher preparation and support. The implication is that addressing these barriers is the key to developing educational approaches that are effective for all students (Ainscow, 2022). In an era where teachers must function as 'high-level knowledge workers,' the development of schools as learning organisations is crucial (Ventista & Brown, 2023). School leaders must support teachers by creating conditions conducive to inclusive schools (Ainscow & Sandill, 2010; Mac Ruairc, 2020).

1.3 The Promise of Universal Design for Learning (UDL)

Ainscow et al. (2006) argue that the discourse on inclusion has evolved beyond merely addressing individual needs to exploring how educational settings, policies, cultures, and structures can recognise and value diversity. This shift is central to the ongoing debate in Irish education concerning the medical versus the social model of disability (Howe & Griffin, 2020; Rao et al., 2014) and differentiation versus UDL. Differentiation focuses on identifying individual student needs but has been criticised for potentially leading to social comparisons, lowered expectations, and curriculum simplification (Westwood, 2001). Conversely, UDL aims to create an inherently accessible curriculum by providing multiple means for students to receive information, engage with material, and demonstrate their learning (Mitchell, 2018).

Proponents of UDL state that it is not just a framework for curriculum design. It is the expression of a belief that all students are capable of learning and that instruction, when crafted and implemented with this belief in mind, can support all students to succeed in inclusive and equitable learning environments (Novak, 2016). The three principles of UDL engagement, representation, and action and expression help address the challenges and leverage the opportunities presented by the diverse student population. These principles offer pathways for currently disenfranchised students and foster the development of all talents, as noted by Rose et al. (2006). The disconnect between an increasingly diverse student population and a one-size-fits-all curriculum, identified by Capp (2017), highlights the need for UDL. Defined as a framework that "proactively builds in features to accommodate the range of human diversity," UDL encourages teachers to anticipate various students' needs from the start of lesson planning rather than modifying materials afterward, as articulated by McGuire and Scott (2006a) and Hitchcock (2001). By "unwrapping" academic standards and integrating UDL into lesson planning, teachers can establish clear goals aligned with these standards and create flexible methods, assessments, and materials to meet their students' diverse needs and preferences, as found by Rao and Meo (2016). This approach enables both general and special educators to design inclusive lesson plans that cater to all learners, including those with and without disabilities.

UDL is designed around three main principals these principles form the foundation for the UDL implementation guidelines developed by (CAST, 2018).

1. Multiple means of Engagement
2. Multiple means of Representation
3. Multiple means of Action and Expression

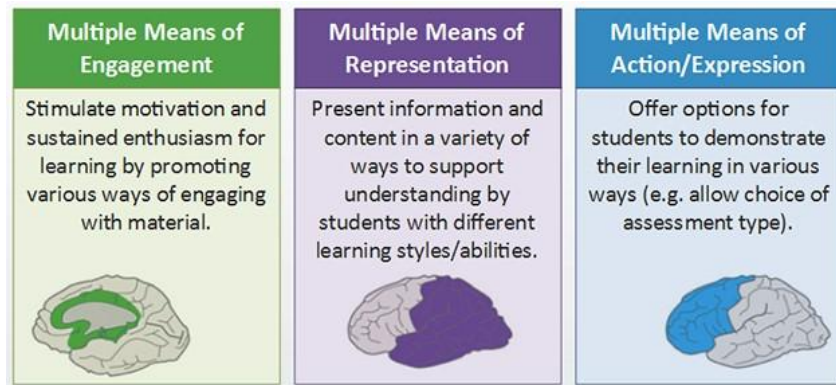


Figure 1-1 Three Main Principles of UDL

Three main Principles of UDL

The UDL Guidelines assist and guide educators in addressing the diverse learning needs of their students. Grounded in the latest research in learning science, these guidelines highlight key areas where student variability is most evident. Organised around the three UDL principles, they serve as a comprehensive resource, offering strategies to create adaptable learning experiences (CAST, 2018; Hall et al., 2012; Meo, 2008).

Ideally, these guidelines should inform the evaluation and planning of methods, materials, goals, and assessments to create maximally accessible learning environments for all students. Viewing the curriculum as a collection of learning opportunities, rather than a set of fixed content, emphasises the need for a learning environment that empowers all students to leverage their strengths. This shift in perspective allows us to recognise students with diverse learning preferences as unique individuals with equal potential for growth (Bali & Caines, 2018).

Universal Design for Learning (UDL) is increasingly recognised in international policy and guidelines as a key strategy for inclusive education. The Global Education Monitoring report “Inclusion in Education: All Means All” (2020)

proposes UDL as an effective approach for ensuring all learners are included in educational settings. UDL promotes inclusivity by adapting pedagogical approaches to meet the diverse needs of students (Quirke and McCarthy 2020). Boothe et al. (2018) further suggest that applying UDL principles enhances students' academic abilities across diverse backgrounds, facilitating their acquisition and use of new knowledge in contemporary classrooms. UDL plays a critical role in creating accessible curricula by reducing pedagogical barriers, making learning more equitable for diverse learners (Galkiene & Monkeviciene, 2021; Kennette & Wilson, 2019). Integrating UDL principles also enables educators to engage students more effectively, fostering social inclusion for all individuals, particularly those with disabilities (Almeqdad et al., 2023; Lowrey et al., 2017). Additionally, Mackey et al. (2023a) highlight UDL's significant impact on various instructional elements, including teacher-student interactions, classroom preparation, pedagogical strategies, and resource selection. Despite its potential, the implementation of UDL is not without challenges. There is a common misconception that UDL is a straightforward practice or strategy that can be quickly adopted to achieve positive student outcomes Basham et al. (2020b). This oversimplification fails to recognise the complex nature of UDL implementation. Others have observed effective implementation necessitates alterations in curriculum materials, instructional practices, behaviours, beliefs, and understandings on the part of teachers involved in the implementation design (Fullan 2014).

Consequently, UDL implementation should be conceptualised as an iterative process rather than a set of rigid steps to follow. It centres on continuous improvement that supports both learning and professional growth (National Centre on Universal Design for Learning, 2012). This perspective aligns with the dynamic nature of educational environments and the diverse needs of learners.

Similar to ongoing debates around inclusive education discussed above, teacher agency plays a pivotal role in the successful implementation of UDL, ensuring that instructional practices are responsive to the diverse needs of all learners. Defined as the proactive capacity of educators to influence their professional practices and educational environments Vähäsantanen (2015), teacher agency empowers teachers to make informed decisions that align

with UDL principles. This includes the ability to self-organise, reflect critically, and adapt teaching strategies to support variability in student abilities, interests, and learning preferences (Bray-Clark & Bates, 2003). Moreover, teacher agency encompasses moral and pedagogical dimensions, enabling educators to enact meaningful reforms that enhance inclusivity and accessibility in their classrooms (Molla & Nolan, 2020).

Teacher agency significantly influences the implementation of inclusive practices. Inclusive education aims to educate all children within a single classroom, regardless of their cognitive or physiological conditions (UNESCO, 1994). Effective inclusive education demands more than knowledge and skills; it requires teachers to have the agency to experiment, reflect, and adapt their practices to meet diverse student needs. Teachers' belief systems and self-efficacy are critical in implementing inclusive practices (Bandura & Wessels, 1997; Leko et al., 2015). Teachers with high self-efficacy view challenges as opportunities for learning and are more likely to adopt inclusive strategies (Hattie, 2012).

The literature highlights the critical need to develop teacher agency for cultivating inclusive educational practices. Empowering teachers through professional learning and development, reflexive practice, and collaborative problem-solving contributes to creating a more inclusive and equitable educational environment that benefits all students. This necessitates a systemic approach, incorporating supportive leadership, whole-school strategies, and a commitment to continuous learning and improvement. Advancing these efforts brings education systems closer to realising the transformative potential of teacher agency in fostering inclusive and impactful educational experiences for all learners.

1.4 The Authors Positionality within the Study

As the author undertakes this study, it is essential to clearly articulate their perspective on inclusive education and the role of Universal Design for Learning (UDL). Like Slee (2001), the author advocates for a broader understanding of inclusion, urging consideration of all forms of educational exclusion. This perspective extends beyond individuals with disabilities to include those at risk of marginalisation due to socio-economic status,

ethnicity, language barriers, and other factors. Such a comprehensive view emphasises the need for strategies that address barriers to learning and participation while ensuring equitable distribution of resources.

From the author's standpoint, UDL is not simply an emerging pedagogical concept; it represents an advanced evolution in the practice of inclusive education, integrating effective instructional strategies into a unified and comprehensive framework. UDL builds upon the foundational principles of differentiated instruction by offering a structured methodology that systematically addresses the diverse needs of learners. This approach aligns with contemporary discourses on equity and accessibility, ensuring that educational environments are inclusively designed from the outset.

The core principles of UDL providing multiple means of engagement, representation, action and expression serve as essential tools for educators committed to creating truly inclusive learning environments. These principles move beyond abstract theories, offering practical solutions to prevent learning obstacles. The author subscribes to the idea that what benefits specific students often enhances learning for all, as highlighted by Meyer et al. (2014), underscoring UDL's potential to improve education for diverse learners.

The author acknowledges that the field of inclusive education is inherently complex, marked by ongoing debates about the true nature of inclusion. The tension between policy and practice often intensifies these challenges, driving a continuous search for definitive paradigms of inclusion. UDL offers a flexible, design-oriented approach to these issues, advocating for instructional strategies that are responsive to the diverse needs of all learners while maintaining the integrity of inclusive pedagogical practices. In times of educational uncertainty, the need to move beyond outdated paradigms and embrace innovative, equitable designs becomes especially crucial.

The author believes that addressing the challenges of inclusive education requires leveraging the collective expertise of the entire educational community, including Special Educational Needs (SEN) professionals. Existing research demonstrates that educators already possess the core competencies necessary to effectively teach a diverse student body. UDL, by providing a structured yet adaptable framework, encourages interdisciplinary

collaboration among educators, fostering a culture of shared pedagogical responsibility. The UDL Guidelines offer a solid foundation for the systematic design of inclusive curricula, promoting a holistic approach to the educational process.

This study is grounded in the belief that UDL, with its focus on cultivating expert learners who are resourceful, strategic, and goal-directed, goes beyond traditional academic performance metrics, fostering authentic and meaningful learning experiences for all students. UDL posits that all students have the inherent capacity to learn when placed in an appropriately designed educational environment. Rather than questioning UDL's ability to achieve full inclusion, the inquiry should instead explore how UDL can enhance the educational experiences of both educators and learners within existing educational frameworks.

Ultimately, UDL has significant implications for both educational policy and practice. By advocating for the design of learning environments that cater to the broadest possible audience, UDL challenges conventional notions of 'normalcy' and calls for a re-conceptualisation of educational standards and assessment methods. However, the successful implementation of UDL requires addressing critical challenges, including the need for comprehensive teacher education, equitable resource distribution, and the integration of technological advancements into curricular designs. In this thesis, the author has strived to provide a balanced examination of the literature, methodology, and findings.

1.5 Theoretical frameworks

This study investigates four socio-cultural theories and their role in enhancing teacher agency during the implementation of UDL practices in inclusive education. These theories are a) Vygotsky and Cole (1978) Socio-Cultural Theory, b) Wenger (1998) Communities of Practice (CoPs), c) Bandura (1977) Social Learning Theory, and d) Bronfenbrenner (1979) Ecological Systems Theory. While each theory independently contributes to our understanding of teacher identity and professional development, Wenger's communities of practice theory holds particular significance within this study's framework due to its emphasis on fostering collaborative learning environments.

Varghese et al. (2005) highlighted the limitations of single-theory approaches in comprehending complex phenomena such as teacher identity formation within diverse educational contexts. Embracing multiple theoretical perspectives not only addresses these limitations but also enriches insights into the intricate processes and contexts that shape teacher agency. Grant and Pérez (2018) propose that for students to experience a transformative learning environment one that is student-driven, inquiry-based, and technology-integrated. Educators themselves must engage in similar experiences through their own professional learning journeys. Teacher agency, viewed through Bronfenbrenner's ecological systems theory, provides a nuanced framework for comprehending the intricate dynamics that mould educators' roles and decision-making within educational environments. Bronfenbrenner's theory describes how individuals are influenced by interconnected systems, ranging from immediate microsystems such as classrooms and schools to broader macrosystems that encompass cultural and societal contexts (Bronfenbrenner, 1979). Given the increasing challenges in classroom environments Elmore (2004), adopting new and improved teaching methods for self-development requires teachers to have commitment and confidence in their profession. Effective professional development (PD) for teachers must address their knowledge, skills, attitudes, and teaching methods. Vygotsky's theory posits that consciousness or thinking links knowledge to actions or behaviour (Lantolf & Appel, 1994). Since knowledge is believed to shape perceptions, examining teachers' discourse can help us understand their underlying perceptions and expectations. There is a growing concern that if teachers' perceptions are inaccurate, they cannot effectively plan instruction to meet students' needs through appropriate interaction (Pelletier & Vallerand, 1996). This is particularly relevant to implementing UDL practices in the classroom, where teachers must actively design flexibility and choice to meet the needs of diverse learners.

Opfer and Pedder (2011) describe teacher learning as a complex system comprising nested systems within systems. This learning is deeply embedded in sociocultural contexts, involving actors, artifacts, situations, and activities essentially context-placed or situated processes. Consequently, the author selected Bronfenbrenner's (1979) ecological model as a framework to examine

the relevance of the cross-sectoral Community of Practice (CoP) in addressing the first research question: "How effective is a cross-sectoral (primary, post-primary, and further education) Universal Design for Learning (UDL) community of practice?"

1.6 The Rationale for the Research

Despite the growing interest in Universal Design for Learning (UDL) as a strategy to reduce barriers in education, there is a notable gap in empirical studies examining its application across primary, post-primary, and tertiary education policies and practices (Bray et al., 2023; Healy et al., 2023; Reynor, 2020). This lack of primary research on UDL's effectiveness and its implications underscores the need for clearer definitions and comprehensive frameworks for inclusive education and UDL implementation (Edyburn, 2010, p. 57).

The importance of implementing UDL frameworks across educational sectors is emphasised by Smith and Lowrey (2017), who argue that UDL cannot be deemed effective if it does not address the diverse needs of all learners. This research study addresses this gap by examining how educators, supported through a cross-sectoral Community of Practice (CoP) with targeted professional development (PD), can effectively implement a UDL model in classroom practice. Specifically, the study investigates the impact of a UDL community of practice on practitioners across primary, post-primary, and Further Education and Training (FET) sectors.

The primary methodology involves the implementation of a school and centre-wide UDL framework, wherein the author supports teachers in developing a UDL ecosystem through targeted professional development interventions. These interventions aim to promote a culture of inclusion and social justice and advance the concept of educational design to support learning for all students. By focusing on the practical application of UDL principles and the creation of supportive professional communities, this study contributes to filling the research void and advancing the effective integration of UDL in diverse educational settings. This study adopted a cross-sectoral, whole-of-life approach to investigate UDL implementation, aiming to bridge the literature gap and provide practical insights for educators. Choosing to position the study within an Irish Education and Training Board the author had access to

participants from primary, post-primary and Further Education FET thus transcending the limitations of an otherwise siloed education system.

1.7 The Study Environment

This research study is positioned within Kerry Education and Training Board (ETB)¹ in the south of Ireland where it is identified as the *UDL Champions Project*. It addresses specific gaps in the literature related to siloed educational inclusive practices and emphasises the importance of socio-cultural and material contexts in exercising professional agency. To understand the challenges and opportunities we first need to look at the educational landscape in which the project is set.

On 1st July 2013, the 33 Vocational Education Committees (VECs) were dissolved and replaced by 16 Education and Training Boards (ETBs). The Education and Training Boards are established under and governed according to the Education and Training Boards Act 2013. Each Education and Training Board is a statutory body with its own corporate status. According to the Education and Training Boards Ireland (ETBI) (2024) the Education and Training Boards are statutory education authorities with responsibility for education and training, youth work and a range of other statutory functions. Education and Training Boards manage and operate Community National Schools, Community Special Schools, Post-Primary Schools, Further Education (FE) colleges, and a range of adult and further education centres delivering education and training programmes. Education & Training Boards (ETBs) are Ireland's leading statutory providers of Education, Training and Youth Work and are unique in providing whole of life education and training to all. The 16 Education and Training Boards have responsibility for 27 Community National Schools and 251 Post-Primary Schools with over 117,000 students. ETB Post-Primary Schools are the largest provider of education through the medium of Irish with 48 schools. ETBs are also the largest provider of multi-

¹ Kerry Education and Training board (ETB) have publicly highlighted their involvement in this study hence the author has named them in the study. However, the identities of all participants have been anonymised to maintain confidentiality, and to ensure an unbiased analysis of the collected data, and to adhere to the stringent requirements outlined in the ethics application.

denominational education in Ireland. ETBs deliver Further Education and Training to 148,000 unique FET learners each year across over 500+ FET providers colleges and Training Centres and play a central role in the delivery of apprenticeships and traineeships in partnership with employers. ETBs also support, monitor, and deliver youth services. The ETB Sector employs over 32,000 people and has a combined annual spend of more than €2bn. This research study is positioned within Kerry Education and Training Board (ETB) in the south of Ireland

Education and Training Boards are the driving force of education and training in the local community, with pathways for every learner across Early Education, Community National Schools, Community Special Schools, Post primary Education, Further Education and Training, Apprenticeships and Traineeships, Youth Services, Outdoor Education Services and Community Education Services.

It is this ethos of inclusion for all that drew the author's attention to Kerry ETB, whose core values centre on ensuring that every person has a right to access education and training opportunities to realise their potential. "We will actively implement these values through our actions and behaviours".



Figure 1-2 Kerry ETB Values

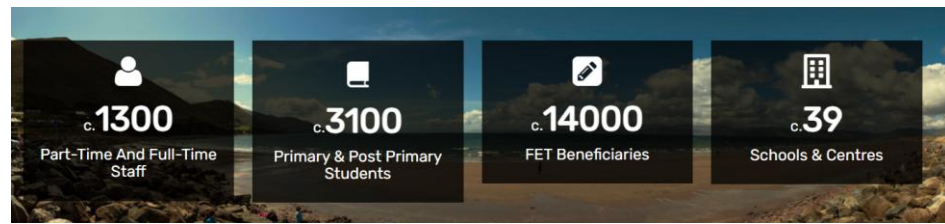


Figure 1-3 Kerry ETB Provision Statistics

Kerry ETB has 1300 staff supporting 3100 primary and post primary students and 14000 Further Education and Training (FET) students in 39 locations throughout county Kerry. Their mission is to create and promote the development of a lifelong learning society in Kerry, so that all who live there have access to the education and training required to fulfil their potential and to meet their personal, social, cultural, economic and civic needs.

1.8 Research Paradigm

Patton (2002) argues that epistemology is grounded in ‘practical understandings’ of concrete, real-world issues. Therefore, this study is situated within the constructivist interpretative paradigm to explore and understand the multifaceted issues of inclusive practice in classrooms, particularly through the lens of teacher agency. Design-based research (DBR) was chosen as the study methodology to ensure, as Brown (1992, p. 143) states, that “an effective intervention should be able to migrate from our experimental classroom to average classrooms operated by and for average students and teachers, supported by realistic technological and personal support.”

Understanding educators' perspectives on inclusive practices and their experiences implementing UDL in their teaching requires a social constructivist approach. By adopting this approach, the author aimed to elicit rich data via qualitative and quantitative methods, allowing for the interpretation of the complex social world in which educators work. The author’s role was to interpret teachers’ attitudes and actions, providing insights into the viability and sustainability of UDL as a framework across the Irish educational system.

This research design aimed to create a socially responsible environment, ensuring equality between participants and the author. The research was

carried out with, not on, a community (Widianingsih & Mertens, 2019). The study is structured around three key components: a community of practice, targeted professional development, and participant-led UDL implementations. The community of practice allowed participants to explore their understanding of UDL within their contexts and through the shared experiences of others in the group. According to Vygotsky (1978), learning transpires through social interactions, and knowledge is constructed within these social contexts.

Existing literature emphasises the urgent need for practical guidance on effectively implementing UDL at the classroom level (Edyburn & Edyburn, 2015; Ok et al., 2017; Rao et al., 2014). Edyburn (2010) emphasises the dearth of primary research on UDL and its implications, suggesting that without a robust research base, validating UDL as an effective intervention is challenging. This gap indicates a critical need for empirical studies and practical guidelines to support educators in implementing UDL strategies effectively within their classrooms. Another significant gap pertains to the role of teachers in implementing UDL. While Spencer (2011) and Vitelli (2015) acknowledge the importance of the teacher's role, this area remains understudied. Fullan (2014) observed that effective implementation consists of alterations in curriculum materials, instructional practices, behaviours, beliefs, and understandings among educators involved in innovations. UDL implementation, therefore, can be viewed as a process of iteration, not a set of rigid steps to follow.

This need for practical guidance in UDL implementation led to the adoption of DBR as the research methodology for this study. DBR is an approach aimed at bridging the gap between research and practice. The dynamic nature of DBR aligns with the ongoing evolution of educational contexts, ensuring that UDL implementation remains responsive to the changing needs of students and teachers. Given that UDL promotes greater flexibility and inclusivity in instructional design, DBR offers a dynamic framework to explore and refine these transformative practices within the complexities of real-world classrooms.

1.9 Research Questions

To address the gaps in the literature the author formulated the following questions:

1. How effective is a cross sectoral (primary, post primary and further education) Universal Design for Learning (UDL) community of practice in supporting the development of a UDL implementation model?
2. To what extent does including targeted professional development as part of a cross sectoral community of practice build teacher capacity to implement a UDL implementation model at whole school/centre level?
3. To what extent can a Universal Design for Learning (UDL) implementation model increase Irish educators ' ability to proactively support learner variability and diversity?

1.10 Organisation of the Thesis

1.10.1 Chapter One Introduction

This Design-Based Research (DBR) study is framed within the broader context of inclusive education, focusing specifically on the application of Universal Design for Learning (UDL) to address the needs of an increasingly diverse student body. Despite widespread endorsement of UDL, its practical implementation in varied educational environments remains insufficiently explored. This research aims to examine how teacher agency can be fostered through engagement in cross-sectoral communities of practice (CoPs) and targeted professional development (PD) to advance UDL practices. The primary objective of this thesis is to develop actionable strategies for educators that effectively bridge the gap between inclusive education policies and classroom practices.

The remaining chapters are organised as follows:

1.10.2 Chapter Two Literature Review

Investigates the transformative journey of inclusive education theory, from historical developments to contemporary practices. Furthermore, it goes on to establish why inclusive education is structured in the way that it is today and describes how past developments in theory and policy have shaped teachers' attitudes, understanding, and agency in everyday inclusive practice. The literature on inclusive education recognises it as a cornerstone of contemporary educational philosophy, advocating for the provision of equitable access and support to all students, regardless of their diverse needs. This principle is enshrined in international frameworks such as the UNCRPD, Agenda 2030 and the UNESCO Salamanca Statement (1994), which emphasises the importance of regular schools with inclusive orientations in combating discrimination, fostering inclusive communities, and achieving education for all.

This chapter situates Universal Design for Learning (UDL) within the broader inclusive education literature demonstrating the potential of UDL as a transformative framework that empowers educators to design inclusive learning environments. Furthermore, it examines literature on the impact of communities of practice (CoPs) and targeted professional development (PD) in fostering collaborative teacher agency and efficacy to implement inclusive practices effectively.

1.10.3 Chapter Three Methodology

This chapter outlines the research design and methodological framework that underpins this study. It emphasises the theoretical foundations and methodological justifications for data generation and analysis. The chapter begins by outlining the study's objectives, research questions, and the overarching research paradigm guiding the inquiry. Subsequently, it provides a detailed explanation of the research study planning and design, data generation, followed by a comprehensive account of the chosen data analysis techniques. The chapter concludes by acknowledging potential limitations of the study which included the self-reported nature of some data, which may be subject to bias, and the limited generalisability of findings due to the specific context of the Irish educational system. To mitigate these limitations, the study incorporates multiple data sources and methods to enhance validity and

reliability. Ethical considerations include ensuring informed consent, protecting participants' confidentiality, and addressing any power dynamics between researcher and participants. Ethical approval has been obtained from the relevant institutional review board, and all procedures comply with established ethical guidelines.

By investigating the development of teacher agency through participation in a cross-sectoral community of practice with targeted PD, this research endeavours to contribute to the enhancement of UDL implementation across diverse teaching contexts.

1.10.4 Chapter Four Findings

The research questions and embedded inquiries were rigorously defined, providing a robust framework for inquiry. Employing a prolonged qualitative data analysis process, the author engaged in reflexive thematic analysis to iteratively refine themes and subthemes to establish meaning and identify key findings. This method facilitated a nuanced understanding of the data, achieved through sustained engagement with qualitative tools.

1.10.5 Chapter Five Discussion

This chapter provides an in-depth analysis of the study's findings, focusing on the three main research themes identified through the data analysis: 1) Communities of Practice, 2) Targeted Professional Development, and 3) Teacher-Led UDL Implementation, and their effects on fostering teacher agency. By relating these findings to existing literature and theoretical frameworks, the chapter seeks to emphasise their significance and implications for both in inclusive educational practice and policy. It also explores how these results enhance understanding of inclusive education and offers practical recommendations for educators and policymakers.

1.10.6 Chapter Six Conclusion

This chapter provides a synthesis of the study's findings and discussions, offering a summary of the key insights gained. It reflects on the overall contributions of the research to the field of inclusive education, particularly in terms of UDL implementation and teacher agency. The chapter also outlines potential directions for future research, emphasising areas where further

investigation could build on the current study's results to enhance the understanding and application of UDL practices.

Chapter 2 Literature Review

2.1 Introduction

This literature review chapter investigates the transformative journey of inclusive education theory, from historical developments to contemporary practices. Furthermore, it goes on to establish why inclusive education is structured in the way that it is today and describes how past developments in theory and policy have shaped teachers' attitudes, understanding, and agency in everyday inclusive practice. The literature on inclusive education recognises it as a cornerstone of contemporary educational philosophy, advocating for the provision of equitable access and support to all students, regardless of their diverse needs. This principle is enshrined in international frameworks such as the UNCRPD (2006), Agenda 2030 and the Salamanca Statement UNESCO (1994), which emphasises the importance of regular schools with inclusive orientations in combating discrimination, fostering inclusive communities, and achieving education for all.

This chapter situates Universal Design for Learning (UDL) within the broader inclusive education literature demonstrating the potential of UDL as a transformative framework that empowers educators to design inclusive learning environments. Furthermore, it examines literature on the impact of communities of practice (CoPs) and targeted professional development (PD) in fostering collaborative teacher agency and efficacy to implement inclusive practices effectively.

2.1.1 Structure of the Literature Review

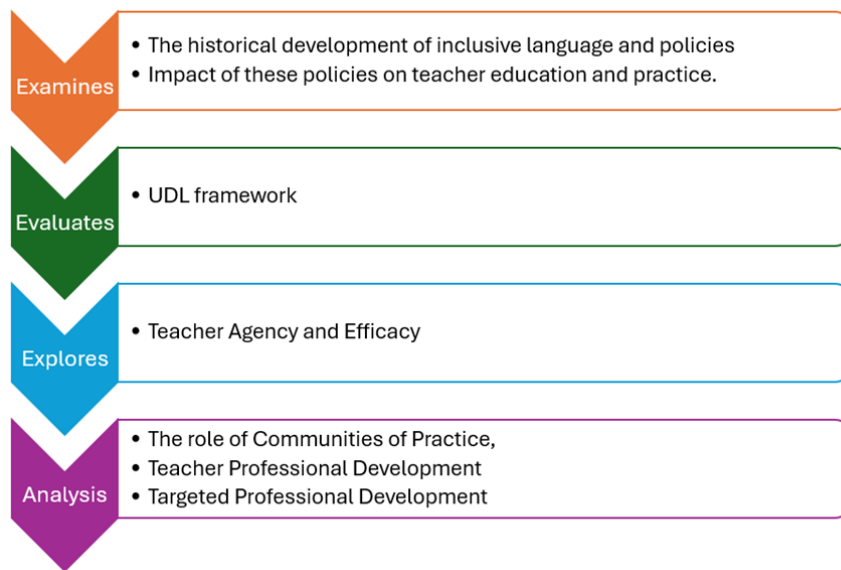


Figure 2-1 Structure of the Literature Review

This literature review explores the evolving landscape of inclusive education. It begins by examining the historical development of inclusive language and policies, and the impact of these policies on teacher education and practice. It then locates UDL within the literature, evaluating its potential to foster inclusive educational practices that support diverse learners effectively. The review then explores the role of Teacher Agency and Efficacy in implementing inclusive practice. Finally, it analyses the role of Communities of Practice (CoP), Teacher Professional Development (PD) and Targeted Professional Development in enhancing teacher capacity to implement UDL.

Through this comprehensive literature analysis, the review aims to contribute insights into how cross-sectoral communities of practice and targeted professional development can empower teachers to implement UDL in ways that promote inclusive educational environments for all. Ultimately, the study seeks to contribute to the ongoing dialogue on how best to support educators in creating inclusive learning experiences for all students.

Before embarking on the development of a UDL implementation model it is important to establish the current and historical factors that influence our understanding of inclusive practice and education for all so that we can better measure its effectiveness as an inclusive education framework with the capacity to meet the needs of all learners. The next section examines the

historical and theoretical foundations of inclusive education, how these understandings have evolved, and the challenges associated with this evolutionary process.

2.1.2 Literature Review Search Strategy

The literature review systematically explored key themes central to the study, including the development of teacher agency through cross-sectoral communities of practice, targeted professional development for teachers the implementation of Universal Design for Learning (UDL) in classrooms, and the evolution of inclusive education policies and practices both nationally in Ireland and internationally.

Search Terms and Keywords		
The search strategy employed a range of keywords and phrases related to the core themes. These were divided into primary and secondary keywords, as well as key phrases.		
Primary Keywords	Secondary Keywords	Key Phrases
• Universal Design for Learning (UDL) • Teacher agency • Communities of practice • Professional development • Inclusive education	• Cross-sectoral collaboration • Educational policy Ireland • International Educational policy • Teacher empowerment • Teacher attitudes • Implementation strategies	• "Building teacher agency" • "Cross-sectoral community of practice" • "Targeted professional development" • "UDL implementation in classrooms" • "Inclusive education policy in Ireland" • "Global trends in inclusive education policy"

Table 1 Search Terms and Keywords

Databases and Sources A variety of academic and professional databases were utilised to ensure a comprehensive literature review. These included:			
Education-Specific Databases	Multidisciplinary Databases	Policy and Government Documents	Professional and Organisational Websites
• ERIC • EBSCOhost	• Scopus • Web of Science • Google Scholar • JSTOR	• OECD iLibrary • European Commission Publications • National government websites (e.g., Department of Education, Ireland, Government of Ireland Circular website) • UNESCO Digital Library	• National Council for Special Education (NCSE, Ireland) • CAST (Centre for Applied Special Technology) • AHEAD • Universal Design for Learning Implementation and Research Network

Table 2 Databases and Sources

Inclusion and Exclusion Criteria To ensure the relevance and quality of the selected literature, specific inclusion and exclusion criteria were applied:	
Inclusion Criteria	Exclusion Criteria
• Timeframe: Research and policy documents from the last 20 years to ensure up-to-date relevance (2004-2024). • Language: Only English-language publications were considered. • Geographical Focus: Emphasis on Ireland for national policy and broader international studies for global trends.	• Non-peer-reviewed sources unless they are official policy documents or reports. • Studies focusing exclusively on non-educational contexts or outside the scope of UDL and inclusive education. • Publications prior to 2004 unless they were seminal works that provide essential foundational theories or concepts.

• Publication Type: Peer-reviewed journal articles, books, policy documents, and official reports.	
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Table 3 Inclusion and Exclusion Criteria

Search Process

The search process involved several stages:

1. **Initial Scoping Search:** A preliminary search to identify the range of literature available and refine search terms and strategies.
2. **Comprehensive Search:** A systematic search across all selected databases using the refined keywords and search terms.
3. **Screening for Relevance:** Titles and abstracts were reviewed to determine the relevance of the identified literature.
4. **Full-Text Review:** Full-text articles were reviewed to ensure they met the inclusion criteria and align with the research objectives.
5. **Backward and Forward Citation Tracking:** Key studies were identified, and their citations were tracked to uncover additional relevant literature.

Data Management

EndNote Reference Management Software was used to manage citations and store PDFs.

2.2 Inclusive Education: Evolution, Challenges, and Theoretical Foundations

The concept of inclusive education has evolved significantly over the last four decades as a fundamental principle in contemporary educational practice, yet its theoretical underpinnings remain diverse and complex. This section aims to navigate the theoretical landscape of inclusive education by examining its foundational models and the predominant theories guiding current academic discourse. The meaning of the term ‘inclusion’ is often taken for granted and seldom defined Rapp and Granados (2021) with many often framing it through the dichotomy of the medical and social models of disability. Traditionally the medical model views disability as an individual problem requiring medical intervention, leading to practices that often segregate students with disabilities into specialised settings Anastasiou and Kauffman (2013), this thinking has informed much of the inclusive and special education literature.

Conversely, the social model posits that disability arises from societal barriers and attitudes, advocating for systemic changes to promote inclusion within mainstream educational environments (Oliver, 1990). This is the model advocated for in UDL literature where Rose and Meyer (2002) say that learner variability should be seen as a strength to be leveraged not a challenge to be overcome.

2.2.1 Historical Overview

Historically inclusion has focused on individuals with disabilities and learning challenges, as documented extensively in scholarly literature and legislative frameworks (Florian, 2008). However, in recent years, the concept of inclusion has expanded beyond individuals with disabilities to encompass those at risk of marginalisation due to socio-economic status, ethnicity, language barriers, and other factors (Ainscow et al., 2006). Slee (2001) urges us to broaden our perspective on inclusion and exclusion, moving beyond the limited theoretical framework of Special Educational Needs (SEN). He advocates for considering all forms of educational exclusion to better understand and meet the needs of inclusive schools in the future. This broader perspective spotlights the need for strategies that address barriers to learning and participation while ensuring resources to support learning and participation are equitably distributed.

Despite widespread acceptance, inclusive education is fraught with terminological and conceptual inconsistencies. For instance, "inclusion" can vary significantly in meaning, as highlighted by (Kauffman & Badar, 2020). Some scholars differentiate between "inclusion," "inclusive education," "inclusive special education," and "inclusive practice," leading to confusion and inconsistency in implementation (Florian, 2019; Shevlin et al., 2013). These inconsistencies affect policy development and classroom practices, often resulting in varied and sometimes conflicting approaches to inclusion (Hegarty, 2001; Hornby, 2014; Lindsay, 2003; Mitchell, 2010). Achieving consensus on a definition of inclusive education is crucial, but understanding its complexities requires a robust theoretical framework.

Florian and Black-Hawkins (2011) acknowledge the broad acceptance of inclusive education as a process of increasing participation and decreasing

exclusion from the culture, community, and curricula of mainstream schools. Theoretical foundations in special and inclusive education have faced criticism for their lack of coherence (Florian, 2014b). Florian (2010) argues for a shift in focus from specialised interventions for individual difficulties in special education, towards a more inclusive approach that strengthens the learning environment for everyone in the classroom. This approach acknowledges individual differences but emphasises extending the benefits of existing resources to all students.

Even in countries like Canada, which is often cited as an exemplar of the inclusive education model, the practice is primarily based on mainstreaming all students (Goldan et al., 2021). Fovet (2022) argues that while physical co-location of students is achieved, there is a critical deficit in effective instructional practices and pedagogy, particularly in professional development for differentiation and UDL frameworks. Fovet further asserts that students share physical spaces but often follow different curricula, receive supplemental instruction, and have varied instructors, resulting in mere geographical inclusion rather than genuine integration.

In Ireland, the National Council for Special Education NCSE (2011) inclusive framework defines inclusion as a process that addresses and responds to the diverse needs of learners by facilitating their participation in learning, cultures, and communities, and by removing barriers within and from education. Despite efforts to integrate students with special educational needs and disabilities (SEND) into mainstream education, Fitzgerald et al. (2021) acknowledge that a parallel system of inclusive and special education continues to exist in Ireland. This system persists even as attempts are made to move towards integrated provision for SEND students along a flexible continuum of support. One of the key issues for teachers in many Irish classrooms, as highlighted by Rose and Shevlin (2020), is that the responsibility for supporting learners with perceived additional needs is often outsourced to expert colleagues. This abdication of responsibility perpetuates the narrative that barriers to learning lie within the student rather than the system design. According to Florian (2008), teachers possess the skills to educate students with diverse needs. However, a lack of confidence in their abilities can hinder their effectiveness. Therefore, it's crucial to address this

by dispelling the misconception that teachers require specialised qualifications to teach students with Special Educational Needs (SEN). Allan (2023a) emphasises that assigning expert status to special needs teachers and SENCOs leads to unrealistic expectations from mainstream teachers and management, further entrenching the special education paradigm. Thomas et al. (2006) argue that successful inclusion hinges on mainstream teachers assuming responsibility for inclusion and being confident in their capacity to educate students with special educational needs. There is an increasing awareness of the growing diversity among school populations worldwide, prompting calls for all educators to be prepared for inclusive education. This call is reflected in UNESCO (2017) policy directives on inclusive education and in recommendations from supranational bodies such as the European Commission (2018).

2.2.2 Challenges and analysis of language

The relationship between policy and practice in achieving inclusive education is inherently complex, as acknowledged by (Ball, 2012). National and International policies often employ terms like 'accommodate' or 'accommodation,' framing disability as an individual challenge rather than a systemic concern. For example, in the Irish education state exam system, the language used when referring to supports for students with disabilities uses "Reasonable accommodations" which are accommodations designed "to remove, as far as possible, the impact of a disability on a student's performance and enable the student to access the state examinations on an equal basis with other students" Scheme of Reasonable Accommodations at Certificate Examinations (RACE) (RACE, 2024, p.84). This language reinforces the belief that disabilities reside within individuals, potentially shaping educators' attitudes and practices in educational settings (Murray et al., 2010). The accommodation approach assumes that students are sufficiently knowledgeable about their disabilities to effectively articulate their needs, which is not universally the case. This challenge is particularly evident for 'hidden' disabilities, such as those of a psychological nature (e.g., learning disabilities, ADHD). Furthermore, the traditional accommodation model does not require all educators to possess the necessary expertise McGuire and Scott (2006b) or prioritise formal training in addressing the diverse needs of

students with disabilities (Murray et al., 2010). McLeskey et al. (2014) and Mull et al. (2001) highlight persistent barriers in education, including educators' inadequate understanding of inclusive practices, difficulties in recruiting and retaining qualified teaching staff, challenges in modifying or developing inclusive curricula, and the continued segregation of students with significant intellectual and behavioural disabilities into separate educational settings.

As Griful-Freixenet et al. (2017) note, the most significant barriers to academic success for students with disabilities relate to the current established model of 'identify, label, tutor and accommodate,' which aims to provide optimal access to the general curriculum (Finn et al., 2001). Additionally, LaRocco (2013) and Oliver (2013) argue that diversity presents pedagogical challenges and opportunities that extend beyond mere accommodations. Current practitioners are recognising that the concept of inclusion, as it is currently framed and articulated, is vague and fragmented, leading to theoretical confusion (Ainscow, 2020a). De Bruin (2022) argues that evidence accumulated over several decades across various policy settings indicates that students with disabilities achieve better academic outcomes when educated in regular education settings. De Bruin therefore argues that it is time to shift the conversation from debating the necessity of including students with disabilities to focusing on how to achieve this inclusion on a larger scale. It is important at this stage of the study to take an in-depth review of the Inclusive Education policy landscape to better understand how it shapes and is shaped by the terminology and conceptual frameworks of inclusive education.

2.3 The impact of National and International Inclusive Education Policies

This research study examines inclusive education practices across three sectors Primary, Post-Primary, and Further Education and Training within a single Education and Training Board in the south of Ireland. By analysing literature on how teachers develop agency to address the inclusion of diverse learners, this chapter seeks to identify the practical translation of policy ideas into everyday educational practices. This investigation is necessary for understanding the extent to which national and international policy

frameworks, such as those outlined by The Salamanca Statement and Framework for Action on Special Needs Education UNESCO (1994), are effectively operationalised within educational systems. To address the research questions posed in the introduction, it is essential to examine the education policy landscape both nationally and internationally, as illustrated in figure 2-2 below. Such an examination provides critical insights into how policy developments have shaped educational systems and practices, thereby influencing the effectiveness of inclusive education. This approach aligns with the assertion by Ainscow et al. (2006) that policy analysis is integral to understanding and improving inclusive practices. Developing inclusive learning environments is a multifaceted process that compels states to assist schools in implementing inclusive strategies for students with disabilities across all areas of educational provision. International legislation, both implicitly and explicitly, aims to ensure full access to mainstream education, allowing disabled students the opportunity to pursue a 'standard' education pathway. Despite the apparent global consensus on the vision for inclusive learning environments, there is significant divergence on the methods for achieving this at national and local levels (Smyth et al., 2014). The unique historical contexts, competing interests, and varying priorities within individual education systems significantly influence the implementation of enabling legislation and the actual educational practices within schools.

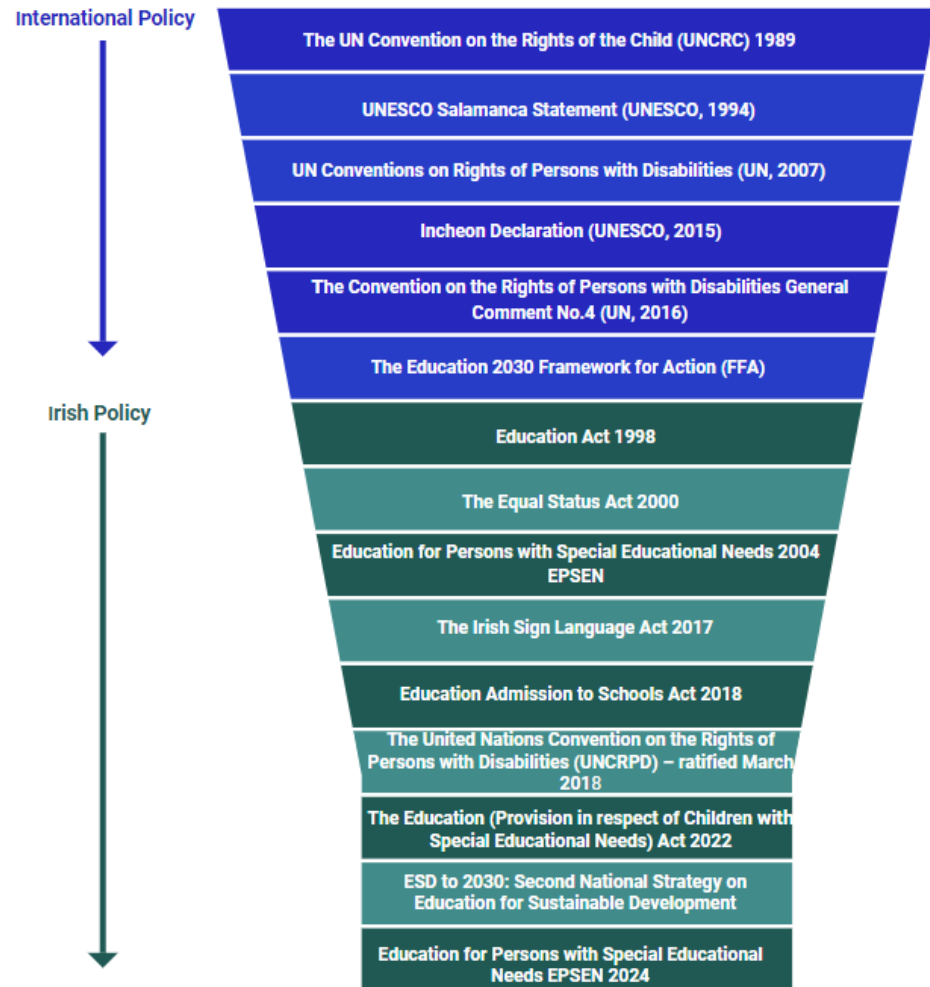


Figure 2-2 National and International Inclusive Education Policy and Legislation

2.3.1 Salamanca Statement (UNESCO, 1994).

A pivotal development in inclusive and special education is the concept of Education for All, as articulated in the UNESCO Salamanca Statement (UNESCO, 1994). This statement asserts that "regular schools with [an] inclusive orientation are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society, and achieving education for all." Moreover, it underscores the efficiency and cost-effectiveness of inclusive education. Despite these promises, Ainscow et al. (2019) highlight that ambiguities in the Salamanca Statement's implementation reveal persistent deficit orientations in special education discourse, which impede more transformative initiatives. This tension highlights the urgent need for a nuanced approach to policy implementation, ensuring that inclusive education extends beyond rhetoric to achieve tangible, systemic change.

The Salamanca Statement's influence is evident in subsequent global and national legislative efforts, such as the UN Convention on the Rights of Persons with Disabilities (UNCRPD, 2006). Article 24 of the UNCRPD mandates that Ireland must ensure people with disabilities have the opportunity to attend mainstream schools as part of an inclusive education system. Specifically, Ireland must ensure that people with disabilities:

- Develop their skills and abilities.
- Are not excluded from any form of education and have their needs met as far as possible, including reasonable accommodation.
- Receive appropriate support to learn, including necessary individualised supports.
- Have opportunities to learn life and social development skills to fully and equally participate in their communities.
- Receive support in learning Braille, Irish Sign Language, and other communication methods, with steps taken to employ qualified teachers proficient in these methods.

2.3.2 The Incheon Declaration 2015

The Incheon Declaration UNESCO (2015) and its Framework for Action further reinforce this commitment by outlining strategies to achieve Sustainable Development Goals. Sustainable Development Goals 4 (SDG4) aims "to ensure inclusive and equitable education and promote lifelong learning opportunities for all" (UN, 2020, p. 1). Despite these comprehensive frameworks, significant challenges persist in their implementation, particularly in resource-constrained settings. Effective implementation requires substantial policy support and resource allocation, often lacking in practice (UNESCO, 2017).

2.3.3 The UNESCO (2017) Guide for Ensuring Inclusion and Equity in Education

The UNESCO (2017) Guide for Ensuring Inclusion and Equity in Education emphasises the need to address all forms of exclusion and marginalisation. It advocates tackling inequalities related to access, participation, and learning processes and outcomes. This includes efforts to enable education systems to serve all learners, especially those traditionally excluded, such as the

financially disadvantaged households, ethnic and linguistic minorities, indigenous people, and persons with special needs and disabilities.

The UN Convention on the Rights of Persons with Disabilities General (CRPD General Comment 4, 2016, par. 9) states, “The right to inclusive education encompasses a transformation in culture, policy, and practice in all formal and informal educational environments to accommodate the differing requirements and identities of individual students, together with a commitment to remove the barriers that impede that possibility”. Despite these comprehensive guidelines, countries often struggle with full implementation due to a lack of political will, insufficient resources, or resistance to change within educational institutions (Galkiene & Monkeviciene, 2021).

International research shows that in most European countries, inclusive education is identified with the teaching of students with SEN in general education schools (Óskarsdóttir et al., 2019). The Irish Government's ratification of the Convention in 2018 reflects a formal commitment to inclusive education. However, integrating special education within this inclusive framework presents ongoing challenges.

The Second National Strategy on Education for Sustainable Development (ESD) to 2030 in Ireland encompasses the entire education continuum, from early learning and care to higher education and research, extending to local communities and youth groups through lifelong learning. Grounded in principles of social justice, equity, and respect for human rights, ESD aims to foster engaged, active citizens motivated to pursue sustainable futures (UN, 2021).

Despite these comprehensive strategies, practical challenges persist in implementing inclusive education, particularly in aligning special education within the broader ESD framework. Effective inclusion requires not only policy support but also adequate resources, professional development for educators, and a systemic shift in educational culture and practice (Allan, 2023b; NCSE, 2024).

The Right Honourable Helen Clark, Chair of the Global Education Monitoring Report Advisory Board, asserts that “inclusion imposed from above will never work” (UNESCO, 2020, p.35). Allan (2023b) emphasises that addressing these challenges necessitates drawing inspiration from teachers, school leaders, and researchers who have pioneered innovative practices for embracing diversity and achieving inclusion. The complexity of this issue becomes apparent in practical application. In both Irish and international contexts, a central unresolved issue is determining the role of special education within the broader inclusive education framework (NCSE, 2011, 2024). The NCSE Policy Advice 2024 has evolved from previous policy advice with a progressive realisation of an Inclusive Education system for Ireland. The advice recommends a phased transition with incremental changes taking place over many years with special schools and classes remaining an important placement option for students and parents. The advice recommends that the Department of Education and the NCSE should seek the evolution of an education system that is configured specifically for the Irish context.

Allan (2023a) argues that building a truly diverse environment in practice and research is fraught with challenges, as entrenched systems often strive for uniformity rather than celebrating differences. This issue is compounded by the research community's hurdles, as policymakers and politicians frequently narrow the focus on inclusion, limiting valuable research scope. Additionally, some researchers struggle to navigate the complexities of diversity within their work, highlighting the need for amore inclusive and flexible approaches to educational research and practice (Koehler et al., 2020). To overcome these challenges, the literature asserts that there must be a concerted effort to integrate inclusive practices into all levels of educational policy and practice, ensuring that the educational needs of all students are met comprehensively and equitably.

2.4 National Frameworks on Inclusive Education

Irish policy operates underneath the international conventions discussed above. Irish schools today reflect a growing appreciation for the variety of learning needs and backgrounds students bring to the classroom. This shift towards inclusivity is the culmination of a long journey that began in the last

century (Rose & Shevlin, 2021). While full inclusion remains an ongoing pursuit (Florian (2014a)), international agreements, policies, and laws have significantly contributed to this positive movement. Ireland's approach to inclusive education has a complex history. Notably, the years since 1990 marked a turning point, with government policy shifting from a focus on segregated education for specific disability categories towards a more inclusive model that integrates students with learning needs or disabilities within mainstream classrooms. Although this policy shift was influenced by a combination of international and national developments as noted by Shevlin and Banks (2021) the policies are unique to the inclusive education landscape in Ireland.

2.4.1 The Irish Education Act 1998

The Irish Education Act 1998 (Section 7, par. a) sets out the right to education for every person in the state. The Act states that a function of the Minister for Education is “to ensure, subject to the provisions of this Act, that there is made available to each person resident in the State, including a person with a disability or who has other special educational needs, support services and a level and quality of education appropriate to meeting the needs and abilities of that person”. The Act emphasises inclusivity and equality of access, including provision for persons with disabilities or other special educational needs and sets out the rights of parents to send their children to a school of their choice.

2.4.2 EPSEN Act 2004

EPSEN (2004) accelerated the changes emerging from the ratification of the (UNCRC, 1989). The Act enshrined in Irish law the right of the child to education, based on equal opportunity with a commitment to educating all children together in an inclusive environment.

Although it still allowed for separation on the following grounds:

1. Where an assessment, carried out under the EPSEN (2004), finds that this would not be in the best interests of the child with special needs.
2. Where this would not be in the best interests of the other children with whom the child is to be educated.

These caveats and the language in EPSEN (2004) allow for the continuation of a dual system of provision in Ireland. This promotes the idea of educational inclusion while retaining a traditional special needs orientation to inclusion that relies on individualised approaches such as the identification and assessment of individual need and specialist provision. Rose (2022) suggests that both international treaties and domestic legislation are caveated in such a way that the principles of inclusion and rights may be over-ridden in certain circumstances. What has been achieved in most educational settings is geographical and social inclusion while creating silos of specialist supports (Fitzgerald et al., 2021).

2.4.3 EPSEN Act Review 2022

On 30 November 2022, the Minister for Education launched a public consultation on the review of the Education for Persons with Special Educational Needs Act 2004 ('the EPSEN Act'). According to the Department of Education's consultation paper, the purpose of this review is to ensure that the law that governs providing education for children with special educational needs ('SEN') is adequate.

Submissions from the Ombudsman For Children, teacher unions and the Irish Human Rights and Equality Commission have highlighted the ongoing challenges in implementing inclusive education in Ireland. Despite significant investments and policy initiatives, the education system continues to struggle with fully integrating learners with special needs.

The literature highlights that Ireland is continuing to try and incorporate learners with special needs into a system that was never designed for them and as a result the system and those charged with enforcing the retrofit of supports and resources are failing under the weight of an impossible task. The education system has attempted to meet the needs of diverse groups with varying degrees of success, by means of additional supports or differentiated teaching see (NCSE, 2013, 2014, 2015, 2016, 2017, 2018). But despite these efforts policy language still emphasises "additional supports" and "differentiated teaching" (NCSE, 2013-2018). CéIM: Standards for Initial Teacher Education document (The Teaching Council, 2020, p. 4) refers to "accommodation and provision of appropriate structures" for learners with

special needs. This language legitimises the idea that education system design is fixed. In recent years the debates around inclusive education in Ireland, have intensified. The NCSE (2024, p.27) Progress report titled 'An Inclusive Education for an Inclusive Society' states that over the last decade, there has been significant growth and investment in disability and special education related supports for students in Ireland. In particular, investment in special needs education has increased from €1.2 billion in 2011 to €2 billion in 2020. Over the period 2011 to 2020, total investment on disability and special education related supports for children and young people increased by €2.4 billion or 51 per cent. The number of students with significant care needs, who are supported by SNAs in schools, increased from 2.7 per cent to 4.2 per cent of the student population accessing additional supports. The corresponding investment in special education teachers increased by 69 per cent from 721 million in 2011 to over 1.2 billion in 2020, corresponding to an increase of 21 per cent in the number of teachers assisting students who require access to additional supports in schools. The Department of Education's expenditure on special needs assistants (SNA) increased by 75 per cent, from 350 million in 2011 to 614 million in 2020 corresponding to a growth of 79 per cent in the number of students whose care needs were supported in schools during this time period.

However, people with disabilities in Ireland finish school earlier than people without a disability and have lower levels of educational attainment 14.4 per cent of disabled people over 15 who have ceased their education only completed primary level education, compared to 7.4 per cent of the general population, though this gap is closing. In 2020/2021, 12.4 per cent of new entrants to higher education were students with disabilities, compared to 5.4 per cent of new entrants in 2011/2012. The number of students in higher education registered with disability support services has increased by 273 per cent since 2008/2009 (DFI 2024).

2.4.4 NCSE 2024 Policy Advice Paper

Following the EPSEN 2022 review, the NCSE (2024) Policy Advice Paper on Special Schools and Classes represents a pivotal step toward the progressive realisation of an inclusive Irish education system, aiming to educate all students according to their strengths and abilities. This policy direction closely

aligns with Booth et al.'s (2002) Index for Inclusion, which advocates for a transformative approach to educational environments. Booth et al. (2002) argue that achieving genuine inclusion requires more than just the physical integration of students with diverse needs; it demands a comprehensive restructuring of school cultures, policies, and practices to fully support and celebrate diversity.

The NCSE's earlier attempt to promote inclusion through its 2011 Framework for Inclusive Education revealed significant challenges, particularly due to the absence of an official mandate and clear policy guidance. While the framework was designed to be flexible and adaptable across different educational settings, this very flexibility led to inconsistent interpretations and applications of inclusive practices, weakening its overall impact. Schools were often left to navigate the framework independently, without the necessary support, leading to a fragmented approach to inclusion. The structural gaps in resource allocation and staff training further exacerbated these issues, making it difficult for schools to implement inclusive practices effectively.

The NCSE (2024) policy appears to address these issues by providing more robust guidance and stronger mandates, reflecting a deeper understanding of what is required for genuine inclusion. Booth et al. (2002) emphasise that inclusion necessitates a radical rethinking of educational environments, where school cultures must be reoriented toward valuing diversity, policies must be systematically inclusive, and practices must be adaptable to meet the varied needs of all students. The NCSE's 2024 policy aligns with this vision by not only emphasising the need for inclusion but also by providing specific guidelines to help schools implement these changes in a coherent and structured manner. This ensures that inclusion is not merely an aspirational goal but a lived reality for all students.

In adopting these policies, Ireland aligns itself with a growing international consensus that inclusive education is not just a moral imperative but also a practical necessity for achieving equity in education. Countries like Finland and Canada have demonstrated success with similar approaches, where systemic support and strong policy frameworks have led to more consistent and effective inclusion across diverse educational settings. The NCSE's latest policy

advice, therefore, represents both a continuation of and a significant development from earlier efforts, integrating the foundational principles of inclusive education as articulated by Booth et al. (2002) while addressing the structural gaps that hindered the effectiveness of the 2011 Framework. By focusing on the practical realisation of these principles, the NCSE (2024) aims to create a cohesive and supportive environment where all students can thrive.

Despite these global and national frameworks, challenges persist in integrating special education within the broader construct of inclusive education within both Irish and international contexts (NCSE, 2011). While the introduction of these initiatives represents a positive step, it's important to acknowledge the current educational landscape.

The Irish education system is characterised by a highly prescriptive national curriculum that places significant emphasis on standardised testing at key stages (Kenny et al., 2020). Post-primary education is divided into the Junior and Senior Cycles, with national standardised tests administered at the conclusion of each cycle. These test results are audited and used for comparative analysis across schools Department of Education and Skills, (2017). All students are eligible to sit these exams, which are offered at two levels: ordinary and higher. In the Senior Cycle, the examination is known as the Leaving Certificate, where points are awarded based on grades, contributing to the Higher Education entrance system. For students who are unable to independently access the exam system, reasonable accommodations are provided. Reasonable accommodations are put in place under the RACE scheme in Ireland to allow students with a disability to access the exam systems. However, the language of the scheme is highly suggestive of a medical model of disability it states (RACE 2024, p.5)

“If a person with a disability is prevented from accessing the service in the normal way, the person providing the service has a duty to do all that is reasonable to accommodate them in accessing it. The particular arrangements that need to be made are then called “reasonable accommodations”.

The use of the word normal in this statement implies that the difficulty lies with the student and not the system design. This further raises the issue of whether "inclusion for all" truly encompasses everyone. If a student can attend six years of post-primary "inclusive education" and still require accommodations to be examined, it is imperative to scrutinise inclusive policy and theory in relation to real-world practice. This discrepancy highlights the need for a critical evaluation of how inclusivity is implemented and whether it effectively meets the diverse needs of all learners. These unresolved issues of theory and practice underscores the complexities and ongoing debates surrounding inclusive education implementation.

Recognising the limitations of traditional approaches, Ainscow (2007b) advocates for an "inclusive turn" focused on removing systemic barriers. This aligns with the principles of UDL by Rose and Meyer (2002), which argue that learning difficulties stem from inflexible materials and methods. A whole-school approach is necessary to develop knowledgeable and skilled teachers in special educational needs, similar to the approach being advocated for in the further and higher education (FET) sector in Ireland where, Quirke and McCarthy (2020) argue that inclusion is everybody's business. A whole-school approach to inclusive education fosters the sharing of knowledge among all teachers and management, thereby empowering them and enhancing their agency to better support the needs of an increasingly diverse student population. This approach emphasises leveraging the expertise of all teachers, particularly Special Education Needs (SEN) teachers, to develop more flexible and accessible learning opportunities for all students. To achieve this, teachers require support to adopt a design-thinking approach, enabling them to continuously design and redesign learning experiences that meet the diverse needs of their students. By adopting a whole-school approach, teachers and management can more effectively mitigate the impact of systemic barriers within the education system, leading to more equitable and inclusive educational outcomes.

Ireland's journey towards inclusive education has reached a critical juncture. The persistent challenges in achieving true inclusion underscore the need for a paradigm shift from a deficit-based model to a systemic approach (Circulars 13 and 14/2017, NCSE Report 2014). Incorporating UDL and systemic reform has

the potential to close the attainment gap and foster true inclusion. However, Ainscow et al. (2006) suggests that inclusion should be viewed as a dynamic, ongoing process that evolves in response to emerging educational needs and societal changes. This perspective highlights the necessity for continuous adaptation and responsiveness in educational practices to cater to diverse student needs.

2.4.5 NCSE Inclusive Education Framework 2011

The National Council for Special Education NCSE (2011) Inclusive Education Framework uses the same definition of special educational needs as that contained within (EPSEN, 2004):

“[Special educational needs are]... a restriction in the capacity of the person to participate in and benefit from education on account of an enduring physical, sensory, mental health or learning disability, or any other condition which results in a person learning differently from a person without that condition...” (Section 1, [1]).

This statement firmly puts the difficulty within the individual and not the system. This approach allows for the othering of individuals and does not promote an examination of the system design. Within the Irish school systems there are a spectrum of support provisions, ranging from in-class assistance to withdrawal for specialised instruction. Students with disabilities and additional needs are often catered for in special classroom settings which in most cases isolate them for some or part of the day from their peers (Banks et al., 2015). For those children who are deemed to have profound needs they are educated separately in special schools this duality of thinking has led to inconsistency in the provision of educational support for students with disabilities and additional support needs. Confused thinking at policy level as suggested by Shevlin and Banks (2021) has resulted in the implementation of special education being grafted on to general educational systems. In such a system learner agency and autonomy are lost for special educational needs or disability (SEND) learners.

It is within this educational atmosphere of confused thinking that the author evaluates the UDL frameworks core tenet that what is “essential for some” is almost always “good for all” (Meyer et al., 2014)

In the next section, the exploration of UDL in practice will investigate how this approach can bridge the gap between policy and practice, ensuring inclusive education becomes a reality for all students. Forlin and Sin (2017) argue specific strategies such as UDL and differentiated instruction are essential in achieving these goals.

2.5 Universal Design for Learning within the inclusive policy landscape

UDL is a scientifically validated framework that has been included in the following educational policies in the United States (US) Every Student Succeeds Act of 2015 and the Higher Education Opportunity Act of 2008 (Hollingshead et al., 2020).

UDL originated from Universal Design and is the deliberate design of instruction to meet the needs of a diverse mix of learners, providing all students with an equal opportunity to learn through flexible approaches, and distinguishing between the desired learning outcome and the means of achieving them.

In Ireland UDL is identified as an educational strategy to support inclusion in:

- The Digital Strategy for Schools to 2027,
- The National Plan for Equity of Access to Higher Education,
- UDL Guidance for FET Practitioners,
- The Student Success – Framework and Toolkit Next Steps Project Recommendations: A Toolkit for Higher Education Institutions.
- CéIM (2020) Standards for Initial Teacher Education.
- National Access Plan 2022 -2028
- NCSE UDL Implementation Pilot Project 2024-2026

In December 2022, the then Minister for Further and Higher Education in Ireland announced the roll-out of projects funded under the National Access

Plan, aimed at fostering inclusive, universally designed higher education environments. Under Phase 1 of PATH 4, €3 million was allocated to higher education institutions to implement universal design and inclusive practices on their campuses, with a focus on enhancing opportunities for students with intellectual disabilities. The Higher Education Authority allocated this funding to support a range of initiatives, including the development and implementation of universal design policies and practices across institutions. Key projects funded included accessibility audits of built and digital spaces, the creation of quiet and sensory areas to promote autism-friendly campuses, and improvements in the digital accessibility of institutional websites and e-learning platforms. Additionally, the funding facilitated the development of UDL resources and curricula for both staff and students and supported capacity building through continuous professional development. It also supported cross-sectoral initiatives such as the development of a National Charter for Universal Design, Banks et al., (2024), a Community of Practice, and a Universal Design Symposium for Tertiary Education.

Furthermore, the National Council for Special Education's (NCSE) Policy Advice Paper 7 (2024) recommended advancing Ireland's education system towards full inclusivity for all learners. The paper suggests that organisations providing Teacher Professional Learning (TPL) services should help teachers and school leaders adopt a UDL approach in professional development programs. In response to these recommendations, the NCSE announced a national UDL pilot implementation project in May 2024, which will support 45 schools across primary, post-primary, and special education sectors for two years. The aim is to enhance the learning, engagement, and participation of students by building teacher capacity to plan for variability, reduce barriers, and support learners who are resourceful, purposeful, and goal oriented. This involves exploring and developing effective models of collaborative partnership between NCSE UDL facilitators and teachers to improve learning outcomes for all students. Additionally, there is a focus on developing and assessing the impact and feasibility of the NCSE UDL support model on both teacher classroom practice and school leadership.

As UDL gains momentum in the Irish education system there is growing need for relevant research within the state education system. Therefore, this review

of the UDL literature aims to comprehensively understand UDL and evaluate its effectiveness in achieving inclusive education for all. By examining the theoretical foundations, policy mandates, and practical applications of UDL, this review seeks to identify both the strengths and limitations of UDL as a framework for inclusive education, providing insights into how it can be more effectively implemented to meet the diverse needs of all learners (Flood & Banks, 2021).

Educators today face two significant challenges: first, developing an education system that meets the needs of an increasingly diverse student population, and second, effectively implementing such a system (Mitchell, 2018). Ainscow et al. (2006) argue that the discourse on inclusion has evolved beyond merely addressing individual needs to encompass broader considerations of how educational settings, policies, cultures, and structures can recognise and value diversity. This evolution is particularly relevant to the ongoing debate in Irish education concerning the medical versus social models of disability (Howe & Griffin, 2020; Rao et al., 2014), as well as the tension between differentiation and Universal Design for Learning (UDL). Differentiation, which involves tailoring instruction to meet individual needs, has been criticised for potentially reinforcing social comparisons, lowering expectations, and oversimplifying the curriculum (Westwood, 2001). In contrast, UDL seeks to proactively design curricula that are inherently accessible, providing multiple means of representation, engagement, and expression to accommodate diverse learners.

It is crucial to avoid oversimplifying the discourse into a binary opposition between differentiation and UDL. The complexity of educational environments necessitates an integrative approach, where UDL is not seen as a replacement for differentiation or other traditional methods, but rather as a framework that enhances these practices. UDL addresses the limitations of existing approaches by emphasising a design perspective that prioritises access and flexibility. This approach allows educators to build upon effective practices in both Special Educational Needs (SEN) and mainstream settings, thereby reducing the need for additional accommodations and making education more accessible to all students.

The shift in inclusion discourse, as described by Ainscow et al. (2006), from addressing individual needs to reshaping educational environments, aligns closely with the principles of UDL. UDL operationalises this inclusive vision by advocating for curriculum designs that are inherently flexible and accessible, thus reducing the need for after-the-fact accommodations. By integrating UDL within existing educational inclusive practices, we can address the shortcomings of differentiation, such as the risk of stigmatisation and lowered expectations (Westwood, 2001), and instead foster an environment where diversity is not only accommodated but celebrated. This approach resonates with the broader shift from the medical model of disability towards a social model, which emphasises the role of systemic structures in either enabling or disabling individuals (Howe & Griffin, 2020; Rao et al., 2014).

The potential of Universal Design for Learning: As a Transformative Framework

The literature presents UDL as a transformative educational framework grounded in cognitive neuroscience, designed to optimise teaching and learning for all students (Meyer et al., 2014). Over the past two decades, UDL has garnered significant attention for its efficacy in promoting inclusion and providing equitable access to the general population of students (Rao et al., 2014; Smith et al., 2019). Rose and Meyer (2002) assert that UDL enables educators to view learner variability not as a challenge but as a strength. This perspective challenges traditional practices that often label and diagnose individuals, emphasising instead the predictable and normal variations in human learning (Meyer et al., 2014). Florian (2019) argues for recognising the uniqueness of every individual as foundational to human diversity and evolution, critiquing approaches that focus narrowly on certain learner profiles. Rose and Meyer (2002) suggest that learning barriers stem more from rigid educational materials and methods than from inherent student limitations, aligning with Rummmer (2004) insight that systemic flaws overshadow individual potential. Traditional educational models, as highlighted by Zhong (2012), create barriers for many students, not just those with identified learning difficulties.

Increasingly, literature is arguing for UDL as a paradigm shift in educational design, urging educators to acknowledge that barriers to learning primarily result from inflexible curriculum designs rather than students' innate learning capabilities (Hasan et al., 2023). This perspective emphasises UDL's promise in achieving social justice by effectively meeting the diverse needs of all learners. Rogers-Shaw et al. (2018) position UDL as a comprehensive framework for enhancing the teaching and learning process, emphasising accessibility, collaboration, and community engagement. Rose et al. (2006) found that structured content and scaffolding strategies significantly enhance student independence, demonstrating how UDL principles can be applied across instructional goals, methods, materials, and assessments to reduce barriers and offer flexible learning options for diverse learners.

Cook and Rao (2018) advocate for educators to select effective practices and adapt them using the UDL framework, thus personalising teaching approaches while retaining essential educational elements. Bray and McClaskey (2016) illustrate how UDL accommodates individual differences and needs through its emphasis on multiple means of engagement, representation, and action and expression (CAST, 2018). Capp (2017) suggests that UDL serves as an effective teaching methodology to enhance the learning process universally. Rose and Meyer (2000) emphasise the importance of introducing flexibility in classroom materials and methods to maximise learning opportunities for all students, including those with disabilities. However, effective implementation of UDL requires educators to receive guidance on adapting pedagogical approaches and materials effectively (Edyburn, 2021). McClaskey (2016) underscores the increasing importance of fostering learner independence through UDL, allowing students to develop into expert learners. Novak (2019) supports this by asserting that UDL empowers educators to remove learning barriers by offering voice and choice, thereby fostering deeper and more meaningful learning experiences.

The literature suggests that integrating UDL into educational frameworks necessitates robust collaboration between educators and policymakers, as highlighted by (Dalton, 2019). This collaboration supports policies aligning practically with broader educational objectives. Additionally, Mitchell (2018) emphasises the significance of joint planning and goal setting, with active

educator involvement in policy development to ensure the practical and effective implementation of UDL principles.

Continuous professional development on UDL principles is deemed essential in the literature, with policymakers urged to support these initiatives through adequate funding and resources (Rose & Meyer, 2002). This engagement is crucial for overcoming resource constraints and ensuring sustained progress in UDL implementation with some commentators arguing that the successful integration of UDL principles hinges on a systemic commitment to inclusivity and flexibility in educational practice (Hehir, 2005). A crucial aspect of this process is the establishment of collaborative monitoring frameworks, where educators and policymakers work together to review progress and challenges, ensuring accountability and fostering continuous improvement in UDL implementation. Additionally, research indicates that feedback mechanisms should be developed, enabling educators to share their insights on policy effectiveness and recommend adjustments to support ongoing progress.

Examining policy mandates such as the UNESCO Salamanca Statement (1994), the Incheon Declaration UNESCO (2015), and national legislation like the Irish Education Act (1998) and EPSEN Act (2004) highlights the pivotal role of UDL principles in fostering inclusive learning environments. Dalton (2019) emphasises UDL's significance in promoting inclusive education for individuals with diverse needs, a stance supported by both national and international educational policies and resources. Flexibility and adaptation in curriculum delivery are crucial for meeting diverse learner needs effectively (Hehir, 2005). This highlights the necessity of creating adaptable and inclusive educational environments through proactive collaboration between educators and policymakers. Continuous professional development for educators, backed by robust institutional support, is critical for maintaining fidelity in applying UDL principles. This support equips educators with the skills to adapt teaching methods and materials to diverse student needs, thereby promoting equitable educational opportunities for all learners.

2.5.1 Understanding the Universal Design for Learning Framework

UDL is not just a framework for curriculum design. It is the expression of a belief that all students are capable of learning and that instruction, when

crafted and implemented with this belief in mind, can help all students succeed in inclusive and equitable learning environments (Novak, 2016). Rose et al. (2006) states that the three principles of UDL can help us meet these challenges and take advantage of the opportunities inherent in the great variability of students, offering paths for those currently disenfranchised and developing the talents of all. Capp (2017) identifies that there is a disconnect between an increasingly diverse student population and a one-size-fits-all curriculum. McGuire and Scott (2006a) defined the UDL framework as one that 'proactively builds in features to accommodate the range of human diversity' and encourages teachers to anticipate a variety of students' needs at the beginning of the lesson instead of modifying materials as an afterthought (Hitchcock, 2001). Rao and Meo (2016) found that by "unwrapping" academic standards and integrating UDL into the lesson planning process, teachers can establish clear goals aligned with these standards and create flexible methods, assessments, and materials to meet the diverse needs and preferences of their students. Both general and special educators can utilise this approach to design inclusive lesson plans that cater to all learners, including those with and without disabilities.

UDL is designed around three main principals these principles form the foundation for the UDL implementation guidelines developed by (CAST, 2018).

1. Multiple means of Engagement
4. Multiple means of Representation
5. Multiple means of Action and Expression

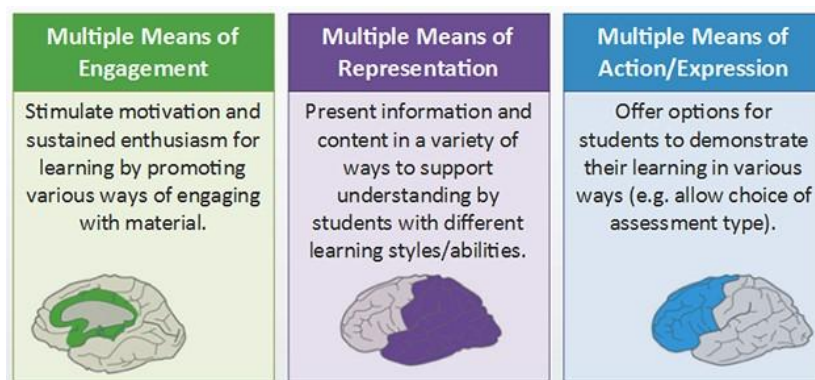


Figure 2-3 Three main Principles of UDL

2.5.2 UDL Guidelines and Implementation

The UDL Guidelines assist and guide educators in addressing the diverse learning needs of their students. Grounded in the latest research in learning science, these guidelines highlight key areas where student variability is most evident. Organised around the three UDL principles, they serve as a comprehensive resource, offering strategies to create adaptable learning experiences (CAST, 2018; Hall et al., 2012; Meo, 2008). They explain how to provide multiple means of engagement, representation, and action and expression in teaching, offering practical strategies for implementation.

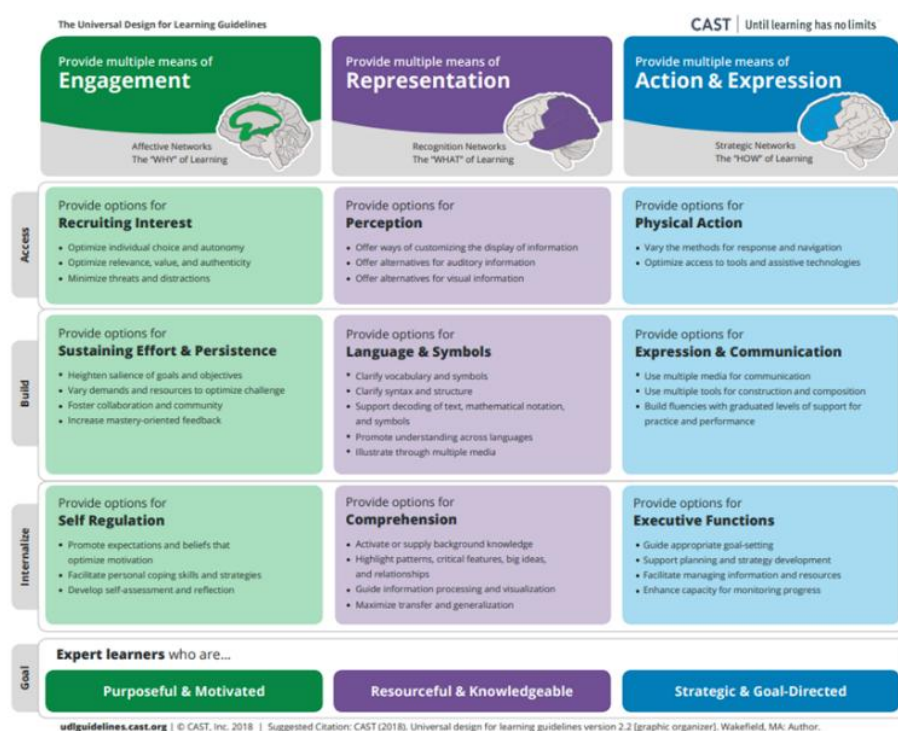


Figure 2-4 UDL Principles graphic representation CAST 2018

The graphic representation of the UDL guidelines outlines the organisational structure of the three core UDL principles, the nine UDL guidelines, and various checkpoints (Appendix 1) for full graphic. Each of the nine guidelines highlights areas of learner variability that could either create barriers or, in a well-designed learning experience, offer leverage points and opportunities for enhanced engagement with learning.

Providing multiple means of engagement	Providing multiple means of representation	Providing multiple means of expression
Guideline 7: Provide options for recruiting interest • Optimise individual choice and autonomy • Optimise relevance, value, and authenticity • Minimise threats and distractions	Guideline 1: Provide options for perception • Offer ways of customising the display of information • Offer alternatives for auditory information • Offer alternatives for visual information	Guideline 4: Provide options for physical action • Vary the methods for response and navigation • Optimise access to tools and assistive technologies
Guideline 8: Provide options for sustaining effort and persistence • Heighten salience of goals and objectives • Vary demands and resources to optimise challenge • Foster collaboration and community • Increase mastery-oriented feedback	Guideline 2: Provide options for language, mathematical expressions, and symbols • Clarify vocabulary and symbols • Clarify syntax and structure • Support decoding of text, mathematical notation, and symbols • Promote understanding across languages • Illustrate through multiple media	Guideline 5: Provide options for expression and communication • Use multiple media for communication • Use multiple tools for construction and composition • Build fluencies with graduated levels of support for practice and performance
Guideline 9: Provide options for self-regulation • Promote expectations and beliefs that optimise motivation • Facilitate personal	Guideline 3: Provide options for comprehension • Activate or supply background knowledge • Highlight patterns, critical features, big	Guideline 6: Provide options for executive functions • Guide appropriate goal setting • Support planning and strategy development

coping skills and strategies • Develop self-assessment and reflection	ideas, and relationships • Guide information processing, visualisation, and manipulation • Maximise transfer and generalisation	• Facilitate managing information and resources • Enhance capacity for monitoring progress
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Table 4 Nine Guidelines for Applying the UDL Framework Cast 2018)

It is crucial to note that these guidelines are not prescriptive but rather offer a set of strategies to overcome barriers inherent in most existing curricula (CAST, 2018). Ideally, these guidelines should inform the evaluation and planning of methods, materials, goals, and assessments to create maximally accessible learning environments for all students. Viewing the curriculum as a collection of learning opportunities, rather than a set of fixed content, emphasises the need for a learning environment that empowers all students to leverage their strengths. This shift in perspective allows us to recognise students with diverse learning styles as unique individuals with equal potential for growth (Bali & Caines, 2018). Somma and Bennett (2020) say that it becomes evident that inclusion extends beyond issues of impairment and disability. It must address learner diversity in the broadest sense, rather than merely responding to exceptional cases. It is widely acknowledged that teachers' expectations for young people from marginalised groups play a crucial role in their success or failure. Low expectations often stem from underestimating a young person's abilities or from holding stereotypical views about their potential achievements (Rose & Shevlin, 2004). Cochran-Smith and Lytle (1999) suggest that the most effective teachers combine practical skills with the ability to understand and use research and other evidence for developing their teaching. The Global Education Monitoring report "Inclusion in education: All means All" (2020) proposes that universal design for learning is an effective strategy for the inclusion of all learners. Boothe et al. (2018) suggests that applying UDL principles enhances students' academic ability from diverse backgrounds in contemporary classrooms to acquire and use new knowledge. UDL plays a crucial role in creating accessible curricula by reducing pedagogical barriers for diverse learners (Galkiene & Monkeviciene, 2021; Kennette & Wilson, 2019). Almeqdad et al. (2023); Lowrey et al. (2017) argue that integrating UDL principles enables educators to engage students more effectively in the learning process, promoting the social inclusion of all individuals, especially those with disabilities. Mackey et al. (2023a) highlights UDL's significant impact on various instructional elements, such as teacher-student interactions, classroom preparation, pedagogical strategies, and resource selection. Almumen (2020); Florian (2015) suggest that implementing

UDL principles is essential for enhancing inclusive practices in schools and developing accessible learning environments.

The ultimate goal of applying UDL to instruction is to help all learners to develop into expert learners, learners who can assess their own learning needs, monitor their own progress, and regulate and sustain their interests, effort, and persistence during learning tasks CAST (2012) regardless of educational placement.

This concept of creating expert learners is not new, Dewey (1925) says “To prepare him for the future life means to give him command of himself” and considered education to be a “process of living and not a preparation for future living”. Ainscow (2020b) suggests that engaging students in the process of developing inclusive practices is essential. UDL prioritises student voice in learning activities. As student populations become more diverse, UDL needs to adapt to their evolving needs. Recognising this, CAST is currently updating the UDL framework to ensure it remains effective for all students, both present and future.

2.5.3 UDL Guidelines Revision

Cast (2020) state that the UDL Guidelines are a living, dynamic tool that is continuously developed based on new research and feedback from practitioners. Since the release of “Version 1.0” in 2008, CAST has released three other versions reflecting different structural and content changes. In 2020, CAST launched their most recent effort to update the UDL Guidelines. This update focuses specifically on updating the Guidelines through an equity lens. While the Guidelines have become a valuable tool to help practitioners design for learner variability, they recognise that gaps and biases exist. They say that there has been a strong call from the field, from both practitioners and researchers to more fully develop the guidelines to address critical barriers rooted in biases and systems of oppression. The current update aims to respond to this call and to work toward fulfilling the promise of the guidelines as a tool to guide the design of learning environments that more fully honour and value every learner.

Overarching Themes

Expand the UDL Guidelines to more fully:

- Emphasise identity as part of variability, including the “who” along with the “why” (Multiple Means of Engagement), the “what” (Multiple Means of Representation), and the “how” (Multiple Means of Action and Expression)
- Acknowledge individual, institutional, and systemic biases as barriers to learning without limits
- Emphasise the value of interdependence and collective learning
- Shift from teacher-centred to learner-centred language

Proposed Updates for Multiple Means of Engagement

Expand the guidelines and checkpoints for Engagement to:

- Centre, affirm, and sustain learners’ strengths and identities
- Emphasise the role of belonging in teaching and learning
- Emphasise the role of joy and play in teaching and learning

The UDL Guidelines 3.0 guidelines were released in July 2024 see (Appendix 2).

2.5.4 The practical application of UDL in learning environments

This section explores the practical application of UDL in educational settings, focusing on several critical areas. It examines implementation strategies and the associated challenges, identifying effective methods for integrating UDL principles while acknowledging barriers such as resistance to change and resource constraints. Additionally, it addresses the theoretical foundations and teaching philosophy underlying UDL, emphasising the shift towards adaptable and inclusive educational practices. The section also considers the importance of mindset in UDL implementation, highlighting how educators' and administrators' attitudes and beliefs significantly influence the success of these initiatives. By analysing these aspects, this section aims to provide a comprehensive understanding of how UDL can be practically applied to create more inclusive and effective learning environments.

2.5.4.1 Implementation Strategies and Challenges

As with all significant policy changes, advancing inclusion and equity necessitates an effective implementation strategy. Specifically, it calls for innovative thinking that highlights the barriers some children face, which lead to marginalisation due to contextual factors like unsuitable curricula, inadequate forms of assessment, and insufficient teacher preparation and support. The implication is that addressing these barriers is the key to developing educational approaches that are effective for all students (Ainscow, 2022). In an era where teachers must function as 'high-level knowledge workers,' the development of schools as learning organisations is crucial (Ventista & Brown, 2023). School leaders must support teachers by creating conditions conducive to inclusive school (Ainscow & Sandill, 2010; Mac Ruairc, 2020; Ventista & Brown, 2023).

Research indicates that educators often feel inadequately prepared to address diverse learning needs, exacerbated by a lack of collaborative planning time (Horne & Timmons, 2009). Clark et al. (1999) argued that mainstream schools should develop structures to respond to the diversity of their student populations. Intentional planning to meet all learners' needs requires an investment of time and practice (NCSE, 2006).

2.5.4.2 Challenges in UDL Implementation

The Universal Design for Learning (UDL) framework provides a solid foundation for creating inclusive pedagogical environments in classrooms. However, implementing this framework remains a significant challenge worldwide, including in Ireland. Both pre-service and in-service teachers often feel overwhelmed by the UDL planning process, which offers broad instructional choices in contrast to more rigid curricula and benchmarks. While secondary school teachers generally view UDL positively, they also express practical concerns, such as rigid approaches to instructional delivery. As a result, it is crucial to offer concrete strategies that support effective UDL implementation (Chen et al., 2023; Israel, 2014).

Effective UDL implementation requires educators to incorporate flexibility into their pedagogy and materials to accommodate the diverse needs of all students (Rose & Meyer, 2002). This level of adaptability is challenging and

highlights the need for substantial guidance to help teachers adjust their practices and materials appropriately. Capp (2020) found that the confidence of general classroom teachers to implement the UDL framework varies between the principles, guidelines, and checkpoints. Fullan (2014) further emphasises that effective implementation necessitates comprehensive changes in curriculum materials, instructional practices, and teachers' beliefs and understandings, changes essential for aligning with UDL's principles of flexibility and inclusivity.

The process of implementing UDL is dynamic, involving active collaboration between teachers and students. Norman (2013) highlights this by noting that design is really an act of communication, which means having a deep understanding of the person with whom the designer is communicating. Therefore, UDL implementation must be meticulously designed and structured to facilitate meaningful communication, ensuring that all participants' voices are heard and considered.

Several critical elements are necessary for effective UDL implementation at the local level, as highlighted by Rose and Meyer (2002). These include technology infrastructure, administrative support, teacher education, redefined roles for educators, new curriculum planning models, community involvement, and creative funding. These factors are crucial for creating an environment conducive to UDL practices. In alignment with this, Dalton et al. (2019) advocates that teacher preparation and professional development programs worldwide must embrace inclusive education practices, including UDL, to effectively prepare future educators.

Training in UDL can significantly and positively impact pre-service teachers' interventionist epistemological beliefs and their perspectives on disability (Lantermann & Applequist, 2018). Such shifts towards more inclusive beliefs are likely to enhance teaching practices, thereby providing better support for students with disabilities in general education classrooms.

Despite its potential, UDL implementation is not without challenges. A common misconception is that UDL is a simple practice or strategy that can be rapidly implemented to yield positive student outcomes (Basham et al., 2020a). This oversimplification fails to recognise the complex nature of UDL

implementation. As Fullan (2014) observed, effective implementation requires changes not only in curriculum materials and instructional practices but also in the behaviours, beliefs, and understandings of the teachers involved in the implementation process.

Consequently, UDL implementation should be conceptualised as an iterative process rather than a set of rigid steps to follow. It centres on continuous improvement that supports both learning and professional growth (National Centre on Universal Design for Learning, 2012). This perspective aligns with the dynamic nature of educational environments and the diverse needs of learners.

2.5.4.3 UDL Theory and Teaching Philosophy

UDL theory emphasises the significance of teachers' habits of mind or teaching philosophy (Meyer et al., 2014). According to Meyer these habits of mind shape teachers' beliefs and guide their teaching actions. Thus, fostering these habits is crucial for the effective implementation of UDL practices.

Traditionally, UDL theory focused mainly on the practical aspects of teaching, often overlooking the pedagogical thinking of teachers (Rose & Meyer, 2002). The modern UDL teaching philosophy highlights three key components: growth mindset, self-efficacy, and self-regulation and motivation for teaching (Meyer et al., 2014).

2.5.4.4 Mindset and Implementation in UDL

Successful UDL implementation begins with the mindset of teachers and schools, which involves challenging assumptions about ability and fostering responsibility for including all learners (Ainscow, 2014). Teachers must adopt a growth mindset, the belief that learners' abilities can be developed through effort and learning (Dweck, 2006). This mindset shapes educators' views of their learners and their instructional approaches.

Empirical evidence supports the efficacy of this mindset in UDL implementation. Griful-Freixenet et al. (2021) demonstrated that preservice teachers who embraced a growth mindset were more inclined to adopt UDL teaching strategies. These findings corroborate earlier research indicating that educators who believe in the malleability of intelligence tend to employ a more diverse array of teaching strategies (Rose & Meyer, 2002). Moreover,

teachers with a growth mindset are more likely to provide the necessary support and resources to facilitate student success, thereby fostering the development of expert learners (CAST, 2018). Such educators also tend to implement more meaningful classroom practices, including cooperative learning, and offer greater support for learner autonomy (Hattie, 2012; Leroy et al., 2007; Trouilloud et al., 2006), all of which align closely with the UDL model.

However, the adoption of UDL principles requires more than just a shift in mindset. Before teachers can effectively design a "UDL buffet" of learning options Novak, (2016), they must first develop a comprehensive understanding of UDL fundamentals and cultivate a robust toolkit of resources that transcends traditional one-size-fits-all lesson planning models. This emphasises the critical importance of professional development in the effective implementation of UDL.

Scott (2018) highlighted the importance of professional development in UDL principles for cultivating inclusive teaching environments. Corroborating this, Craig et al. (2022) showed that evidence-based professional development positively influences teachers' practices. However, it is important to note that brief, isolated professional development sessions, such as one-day workshops, often fail to impact practices or foster sustained change (Fixsen, 2005). This highlights the need for ongoing, comprehensive professional development initiatives in UDL implementation.

2.5.4.5 Evidence of effects of UDL Implementation

Despite the challenges, research has demonstrated the positive effects of UDL implementation across various educational contexts. UDL is utilised across the globe as a primary referenced framework in supporting UNESCO's Sustainable Development Goal (SDG 4) to develop inclusive, equitable, and quality lifelong learning opportunities for all UNESCO Source Documents, (2020). Schreffler et al. (2019) found that UDL principles enhance learning outcomes for students with and without disabilities in higher education settings. Similarly, Capp's (2017) review of UDL effectiveness concluded that UDL principles enhance learning outcomes for all students. Basham et al., (2020b) preliminary

research indicates UDL is useful in supporting both micro (e.g., single learning experience) and macro (e.g., state, district) level designs).

Al-Azawei et al. (2016) provided evidence that the UDL framework creates flexible learning environments and accessible content. However, they also highlighted challenges in its application, underscoring the complexity of UDL implementation. Building on this, Smith et al. (2019) emphasised the need for operationalising UDL, preparing professionals for implementation, identifying facilitation tools, and measuring UDL's impact to improve implementation.

Collectively, the literature highlights that the practical application of UDL in learning environments requires comprehensive support structures, a growth mindset among educators, and effective professional development.

Furthermore, there is a pressing need to address common misperceptions and continue research into UDL's efficacy to strengthen its implementation and impact on diverse learners.

2.5.5 Measuring UDL Implementation: Challenges

UDL is a construct that is understood, defined, and applied in diverse ways. At one end of the spectrum, UDL is often equated with inclusive practices, while at the other end, it refers to specific technical guidelines for accessibility. There is no consensus within the UDL community on the precise definition or practical application of UDL. Despite general agreement on its role in promoting inclusion, significant questions remain regarding its measurement. Defining UDL is challenging due to its diverse interpretations (Rao et al., 2020). Thus, it is imperative to examine the difficulties in measuring and implementing UDL across educational sectors, recognising its inherent fluidity.

Unlike standardised approaches with fixed metrics, UDL thrives on continuous modification based on individual needs and evolving contexts, making its impact difficult to capture with traditional measures. While measuring learning gains is straightforward, capturing how UDL fosters engagement, motivation, and self-regulation – crucial pillars of inclusive learning – is more complex (Basham et al., (2020a); Smith et al., (2019).

Separating UDL-aligned practices from other methodologies complicates measurement. Differentiated instruction shares similarities with UDL but

differs in its proactive design versus reactive accommodations (Griful-Freixenet et al., 2020). Technology integration must also be evaluated to ensure it addresses barriers and unlocks potential, rather than merely adding superficial enhancements (Grant & Pérez, 2018). These distinctions are crucial when assessing UDL's true impact. Research emphasises these complexities. Basham et al. (2020b) highlight the "challenge in achieving consistent measurement" due to UDL's adaptable and iterative design. Craig et al. (2022) recognise UDL's effectiveness in designing tools and lessons but note limitations in measuring its broader impact. Smith and Lowrey (2017) call for effective models to capture UDL's integration in inclusive settings.

The literature on UDL impact suggests several strategies for addressing the challenge of measurement:

1. **Develop UDL-Specific Assessment Tools:** Create assessments that capture UDL's unique benefits, such as student self-regulation and engagement (Edyburn & Edyburn, 2015).
2. **Utilise Mixed-Method Approaches:** Combine quantitative measures with qualitative data, such as observations and student reflections, to provide a fuller understanding of UDL's impact (Dawadi et al., 2021).
3. **Focus on Process Measures:** Track implementation processes, including teacher behaviour and resource utilisation, to gain insights into UDL's fidelity and impact (Rao et al., 2020).
4. **Embrace Long-Term Perspectives:** Implement longitudinal studies to track student progress over time, providing a comprehensive picture of UDL's effectiveness (Saldaña, 2003).
5. **Foster Collaborative Meaning-Making:** Encourage collaboration among educators, researchers, and stakeholders to develop shared understandings and meaningful assessment practices. Creating systems of critical friends can support inclusive practice development through shared experiences (Costa & Kallick, 1993).

The models proposed in the existing literature for promoting widespread UDL adoption in schools have been overly simplistic and, as a result, relatively ineffective. These models typically emphasise the pedagogical benefits of UDL within the classroom while overlooking the intricate process of implementing

it across entire school systems (Basham et al., 2020a). Looking forward, there is a pressing need to identify and utilise a theoretical model that fully acknowledges the complexity of school organisational landscapes. Multiple stakeholders influence outcomes, and the interactions among these stakeholders, along with the complexity of their relationships, will significantly impact how change is managed and embraced, thereby shaping the adoption of UDL (Banks, 2022).

Ultimately, much of the literature suggests that measuring UDL's impact requires a paradigm shift. Recognising its inherent dynamism and tailoring reporting approaches accordingly is key. By developing UDL-specific tools, employing mixed methods, focusing on process measures, and embracing long-term perspectives, practitioners can navigate the complexities of effective measurement and unlock UDL's transformative potential for inclusive learning.

2.5.6 Reporting on UDL Implementations

The literature on UDL implementation highlights several critical issues related to reporting, including inconsistency in reporting standards, lack of fidelity in implementation, insufficient evidence of effectiveness, and challenges in measuring outcomes.

2.5.6.1 Inconsistency in Reporting Standards

A primary concern in UDL implementation reporting is the notable lack of standardised reporting practices. Rao et al. (2014) emphasise that the diverse frameworks and metrics used in different studies make it challenging to compare results and draw comprehensive conclusions about UDL's effectiveness. For example, some studies employ qualitative measures to assess teacher perceptions, while others rely on quantitative student performance data, leading to inconsistencies in the reported outcomes. This variability in reporting methods creates significant obstacles in synthesising findings across studies and building a cohesive understanding of UDL's impact.

2.5.6.2 Fidelity in Implementation

Ensuring fidelity in UDL implementation presents another significant challenge. Rao et al. (2016) argue that many reports fail to adequately describe how closely implemented practices adhere to UDL guidelines. This

lack of detail can obscure the true impact of UDL practices on educational outcomes. The literature suggests that without clear documentation of implementation processes, it becomes difficult to ascertain whether positive student outcomes are due to UDL or other variables. This ambiguity undermines efforts to establish causal relationships between UDL practices and educational outcomes.

2.5.6.3 Limited Empirical Evidence

Despite strong theoretical support for UDL, empirical evidence demonstrating its effectiveness remains limited. Rao et al. (2014) note that while some studies report positive outcomes, the variability in implementation and reporting standards results in mixed findings, complicating the establishment of a robust evidence base. This inconsistency is further highlighted by Meyer et al. (2014), who point out that standardised assessments may not fully capture the diverse benefits of UDL, leading to underreporting of its effectiveness. The multifaceted nature of UDL, which includes multiple means of engagement, representation, and action and expression, produces varied learning outcomes that standardised tests may not adequately measure.

2.5.6.4 Educator Knowledge and Training

The success of UDL implementation also heavily relies on the knowledge and training of educator and some research studies emphasise that many educators are not sufficiently trained in UDL principles, leading to inconsistent application and reporting of UDL practices (Katz and Sokal, 2016). This lack of training can result in teachers misunderstanding or misapplying UDL strategies, thereby diminishing their effectiveness and complicating efforts to measure their impact accurately.

2.5.6.5 Contextual Variability

UDL implementations occur in diverse educational contexts, ranging from primary school to higher education, each presenting unique challenges and resources. It is well recognised that despite growing interest in UDL as a means to reduce barriers in education, empirical studies on its application in primary, post-primary, and tertiary education policies and practices are notably lacking (Bray et al., 2023; Healy et al., 2023; Reynor, 2020). This variability can influence both the fidelity and effectiveness of UDL practices,

making it difficult to generalise findings across different settings (Rose et al, 2006).

2.5.6.6 Proposing Solutions and Recommendations

Several strategies have been proposed to address these issues and enable the development of high-quality, robust research. From the critical analysis of the literature, the following strategies are suggested:

Rigorous Research Designs: There is a need for more robust research methodologies that can effectively capture the multifaceted nature of UDL implementation and its outcomes.

Standardised Reporting Guidelines: Developing and adopting standardised reporting guidelines could facilitate more consistent and comparable reporting of UDL implementations across studies.

Comprehensive Training Programs: Enhancing educator training in UDL principles and practices is crucial for ensuring fidelity in implementation and accurate reporting.

Increased Collaboration: CAST (2018) advocates for increased collaboration between researchers and practitioners to ensure that UDL implementations are both effective and faithfully reported.

Standardised Framework for Reporting: Smith et al. (2019) argue for developing a standardised framework for reporting UDL implementation, which could help in systematically capturing and comparing data across different studies, thereby building a stronger evidence base for UDL.

2.5.6.7 The Universal Design for Learning Reporting Criteria (UDL RC)

Another significant response to these challenges, the Universal Design for Learning Reporting Criteria (UDL RC) were developed in 2018 as an initiative of the UDL Implementation and Research Network (UDL-IRN) Research Committee. These criteria aim to standardise the reporting of UDL studies and support researchers and practitioners in implementing UDL-based practices and measuring related outcomes.

For researchers, the UDL research criteria serve as a critical tool in both the design and reporting of studies. They emphasise key components that should

be considered and clearly articulated when designing a UDL-based practice or intervention. For example, proactive and intentional design is a fundamental aspect of UDL (CAST, 2018). By explicitly stating the rationale for applying UDL during the design phase, researchers are more likely to provide detailed and clear reports on their UDL usage. This clarity helps distinguish deliberate UDL applications from incidental supports.

Furthermore, clear descriptions of UDL components in the design and implementation phases provide essential information for replication studies, thereby contributing to the evidence base on effective UDL practices (Rao et al., 2016). Such detailed reporting allows the UDL field to systematically build knowledge about what works, as emphasised by Rose et al. (2006), who discuss the variability in UDL applications across different educational contexts. Edyburn (2010) explains that the need for data-based decision making is a critical aspect of teaching through the UDL framework.

For practitioners, detailed reports on UDL applications offer models of how the framework can be applied in practice and the outcomes associated with these applications. This information enables practitioners to customise UDL-based practices for their classrooms, taking into account factors such as learner variability, barriers, and access issues (Katz & Sokal, 2016).

Practitioners seeking to publish their UDL applications can use the research criteria as a blueprint for reporting their practices, ensuring that their descriptions align with the broader research community's standards.

2.5.6.8 Conclusion: Towards a Comprehensive Understanding of UDL

Defining a construct like UDL, which is understood differently depending on the individual's perspective, presents significant challenges. However, the literature suggests that by reporting on common aspects, it is possible to build a comprehensive knowledge base of UDL applications and examine their efficacy across studies (Meyer et al., 2014). While the UDL research criteria allow for some interpretation in their use and application, their flexibility and nonprescriptive nature make them adaptable to various contexts, thus accommodating the diverse lenses through which individuals view UDL implementation (CAST, 2018).

There is, therefore, a need to foster teacher agency in UDL implementation, which involves empowering educators to creatively adapt and apply UDL principles in ways that optimise learning opportunities for all students, thus promoting inclusive educational environments aligned with the goals of UDL (CAST, 2018). This approach recognises the dynamic nature of UDL and the crucial role of educators in its effective implementation, paving the way for more nuanced and context-sensitive applications of UDL principles in diverse educational settings. The next section explores the role of teacher agency in detail and its impact on UDL implementation.

2.6 Teacher Agency

Teacher agency plays a pivotal role in the successful implementation of UDL, ensuring that instructional practices are responsive to the diverse needs of all learners. Defined as the proactive capacity of educators to influence their professional practices and educational environments Vähäsantanen (2015), teacher agency empowers teachers to make informed decisions that align with UDL principles. This includes the ability to self-organise, reflect critically, and adapt teaching strategies to support variability in student abilities, interests, and learning preferences (Bray-Clark & Bates, 2003). Moreover, teacher agency encompasses moral and pedagogical dimensions, enabling educators to enact meaningful reforms that enhance inclusivity and accessibility in their classrooms (Molla & Nolan, 2020). By fostering teacher agency within the framework of UDL, educators can create dynamic learning environments where personalised instructional approaches lead to increased student engagement, motivation, and academic achievement (Rose & Meyer, 2002). This section explores the critical role of teacher agency in supporting the implementation of UDL, emphasising its impact on fostering inclusive educational practices that cater to the diverse strengths and needs of all learners.

2.6.1 Development of Teacher Agency

Developing teacher agency is a complex, dynamic process requiring continuous professional learning, reflexive practice, and a supportive environment. Molla and Nolan (2020) emphasise the importance of agency freedom, which allows teachers to engage in autonomous actions and

innovative practices. However, achieving transformative agency demands moving beyond traditional professional development focused on "knowing, doing, and believing." It requires fostering environments that encourage experimentation, critical reflection, and collaborative problem-solving (Rouse, 2008).

Transformative agency is not just about individual empowerment but also involves collective efforts. Engeström (2014) argues that transformative agency emerges from disturbances, conflicts, and contradictions within collective activities, prompting joint examination and envisioning of new possibilities. Haapasaari et al. (2016) further emphasise that demanding situations coupled with opportunities for collaborative analysis and redesign create fertile ground for cultivating this agency. True inclusivity demands not just knowledge expansion but also reconsidering attitudes and beliefs, a process requiring collaborative exploration and support (Rouse, 2006).

2.6.2 Impact of Teacher Agency on Inclusive Practice

Teacher agency significantly influences the implementation of inclusive practices. Inclusive education aims to educate all children within a single classroom, regardless of their cognitive or physiological conditions (UNESCO, 1994). Effective inclusive education demands more than knowledge and skills; it requires teachers to have the agency to experiment, reflect, and adapt their practices to meet diverse student needs. Teachers' belief systems and self-efficacy are critical in implementing inclusive practices (Bandura & Wessels, 1997; Leko et al., 2015). Teachers with high self-efficacy view challenges as opportunities for learning and are more likely to adopt inclusive strategies (Hattie, 2012).

2.6.3 Strategies for Nurturing Transformative Teacher Agency

To nurture transformative teacher agency and foster inclusive education, a comprehensive approach integrating several key strategies is essential. Professional development stands as a cornerstone, offering continuous learning opportunities that enable teachers to engage in reflexive practice, collaboration, and experimentation. By specifically addressing inclusive education, these initiatives equip educators with the knowledge and skills

necessary to support diverse learners effectively (Hargreaves & Fullan, 2013; Molla & Nolan, 2020; Nolan & Molla, 2017).

Supportive leadership plays a pivotal role in cultivating inclusive school environments. Educational leaders must actively promote principles of inclusion and equity by establishing clear policies, allocating resources, and fostering a school culture that values and supports inclusive practices (Ainscow, 2020). This leadership ensures that teachers feel empowered and supported in their efforts to implement inclusive strategies. A whole-school approach is vital to fostering inclusive education. Collaboration among teachers, administrators, parents, and students enhances the development and implementation of inclusive practices. By leveraging the collective experience and expertise of all stakeholders, schools can create a supportive environment where inclusive education thrives (Ainscow, 2020). Additionally, fostering collaborative problem-solving among teachers moves beyond individual training. Creating spaces for collective identification of challenges, sharing experiences, and exploring solutions encourages a shared understanding and commitment to inclusive practices (Häkkinen et al., 2017). Cultivating a culture of reflexive practice further enhances teacher agency. Providing opportunities for teachers to critically analyse their practices, successes, and challenges within a supportive community promotes continuous improvement and adaptation of inclusive teaching methods (Brookfield, 2017). Encouraging teachers to experiment with new approaches acknowledges the inherent risks involved in innovation. Providing space for shared learning and analysis of results supports adaptive teaching practices that better meet the diverse needs of students (Kiraly, 2014).

Moreover, nurturing critical dialogue about social justice, diversity, and inclusion fosters an environment where teachers can confront biases and envision more equitable educational practices (Boutte, 2008). Open discussions allow educators to explore challenging topics collaboratively and develop inclusive approaches that promote educational equity.

Teacher agency can also have a powerful influence on teachers' classroom practices, student learning outcomes, and other professional undertakings. Teachers with high agency and self-efficacy are better equipped to create

inclusive learning environments that cater to diverse student needs, fostering both academic and social growth (Bandura & Wessels, 1997; Pajares & Schunk, 2001). Inclusive practices promote equity, ensuring that all students have the opportunity to participate, achieve, and thrive in their educational journey (UNESCO, 1994).

The literature highlights the critical need to develop teacher agency for cultivating inclusive educational practices. Empowering teachers through professional development, reflexive practice, and collaborative problem-solving contributes to creating a more inclusive and equitable educational environment that benefits all students. This necessitates a systemic approach, incorporating supportive leadership, whole-school strategies, and a commitment to continuous learning and improvement. Advancing these efforts brings education systems closer to realising the transformative potential of teacher agency in fostering inclusive and impactful educational experiences for all learners.

2.6.4 Reflection in Practice

Schön (1987) argues that professional education should be centred on enhancing the practitioner's ability for "reflection-in-action" that is, learning by doing and developing the ability for continued learning and problem solving throughout the professional's career. The importance of teaching pre-service teachers to be thoughtful about both teaching and schooling cannot be understated (Hébert, 2015). Developing a professional identity requires the ability to reflect on and evaluate practice, prescription, and one's own thoughts (Moyles, 2001). As Schön (1987) notes, it is through reflection in and on practice that practitioners make "sense of uncertain, unique or conflicted situations of practice".

Hick et al. (2019) found that reflexive practice in the ITE programme documentation is framed more broadly, stressing the need for the future teacher to reflect not only on their own practice, but also on the beliefs and practices of others, on curriculum and assessment policy, on school and local and national policies.

Reflexive practice, the bedrock of most teacher education programmes, is one area which often falls victim to the theory–practice divide (Harford et al.,

2010). Nonetheless, Kramer (2018) contends that while reflective practice is often praised for enhancing teachers' agency, expanding their capacity for action, and opening pathways for professional development, it has also faced criticism for sometimes straying from its intended goals. This deviation can result in a state of non-reflection, which hampers opportunities for transformative growth. Additionally, it has been criticised for its excessive and diluted usage, resulting in a loss of conceptual clarity. Whereas McGarr and Emstad (2022) argue that within the context of significant changes in teacher education over the past decade, there is a need to explore how reflexive practice is conceptualised in teacher education, particularly amidst ever-increasing neo-liberal and performativity discourses which have the potential to subvert more critical and emancipatory conceptions of reflexive practice. McGarr and Emstad (2022) also suggest that making the distinction between reflexive practice integrated within planning and teaching cycles and critical reflexive practice aimed at examining both personal aspects and broader socio-political dimensions of schooling would be a good starting point for broadening the discussion on reflection in practice.

2.6.5 Creating a culture of collaboration

In an era of rapid change and increasing educational demands, the need for a strong, collaborative culture in teaching has never been more pressing. Research consistently highlights the transformative power of collaboration, demonstrating its ability to enhance teacher expertise, improve student outcomes, and ultimately foster a thriving educational environment. Sutton and Shouse (2016) state that collaboration builds teacher trust and expertise and enables schools to implement changes in instruction with greater ease and comfort. Central to cultivating a collaborative culture is acknowledging teachers as professionals with valuable insights, experiences, and expertise capable of enhancing the educational process (Louis & Marks, 1998). Banerjee et al. (2017) argue that a strong professional community where there is school spirit, a sense of collegiality and continuous learning and sharing of ideas among teachers, agreement on school mission, and better communication from school administrators regarding a central mission for the schools can serve as a cushion that can mitigate some of the harmful effects of teacher dissatisfaction translating into lower student achievement.

García-Martínez et al. (2021) found that teacher collaboration plays a crucial role in school improvement by enhancing both social and professional capital. Such collaborative support not only allows teachers to assume new responsibilities within their schools but also promotes their professional development.

Peterson and Brietzke (1994) underscore the significant influence of collaborative cultures in educational settings. They highlight that these cultures create a supportive environment in which teachers can cultivate their craft knowledge, build efficacy, and form strong connections with colleagues, parents, and students. Drawing on the work of Ashton et al. (1984), Fullan (2015), Lortie (2008), and Rosenholtz (1989), Peterson and Brietzke identify several key features that define collaborative cultures. Firstly, collaborative cultures provide regular opportunities for continuous improvement and career-long learning. This ongoing professional development not only enhances teachers' skills but also cultivates a sense of efficacy and reduces the uncertainty often associated with teaching. Within these cultures, teachers are more likely to trust, value, and share expertise with their colleagues, fostering a collaborative atmosphere where team teaching, and shared decision-making are encouraged. This collaborative ethos extends to planning cooperatively and celebrating shared accomplishments, which further strengthens teachers' commitment to improving their practice.

Moreover, teachers in collaborative cultures actively seek and exchange ideas through seminars, conferences, and professional networks, both within and beyond their schools. This external professional networking not only enriches their professional knowledge but also supports ongoing self-renewal, which is integral to the culture of continuous improvement within the school community.

Collaborative cultures represent more than just a supportive environment for teachers; they embody a philosophy of collective learning, trust, and efficacy that enhances educational outcomes and fosters a dynamic community committed to professional growth and excellence. These cultures are characterised by a shared commitment to improvement, collaboration, and

the continuous development of both individual educators and the school community as a whole.

2.7 Teacher Professional Development Theoretical frameworks

This section investigates four socio-cultural theories and their role in enhancing teacher agency during the implementation of UDL practices in inclusive education. These theories are a) Vygotsky and Cole (1978) Socio-Cultural Theory, b) Wenger (1998) Communities of Practice (CoPs), c) Bandura (1977) Social Learning Theory, and d) Bronfenbrenner (1979) Ecological Systems Theory. While each theory independently contributes to our understanding of teacher identity and professional development, Wenger's communities of practice theory holds particular significance within this study's framework due to its emphasis on fostering collaborative learning environments.

Varghese et al. (2005) highlighted the limitations of single-theory approaches in comprehending complex phenomena such as teacher identity formation within diverse educational contexts. Embracing multiple theoretical perspectives not only addresses these limitations but also enriches insights into the intricate processes and contexts that shape teacher agency. Grant and Pérez (2018) propose that for students to experience a transformative learning environment, one that is student-driven, inquiry-based, and technology-integrated, educators themselves must engage in similar experiences through their own professional learning journeys.

2.7.1 Teacher Communities of Practice CoP

Central to this research is the question: How effective would a cross-sectoral (primary, post-primary, and further education) UDL community of practice be in supporting the development of a UDL implementation model? This section explores the theoretical underpinnings of CoPs, emphasising their role in driving systemic educational transformation. Key aspects examined include the core principles of CoPs, their capacity for collaborative knowledge building, the significance of shared practices, and their influence on teacher support, collaboration, and professional growth. The section highlights the

advantages of CoPs in navigating change, disseminating knowledge, and enhancing both teaching methodologies and student outcomes.

Buyse et al. (2003) emphasise that communities of practice (CoPs), grounded in collective expertise and aimed at evaluating and enhancing education, enable practitioners and researchers to co-construct knowledge. This collaborative approach invites both groups to share, expand upon, and transform their understanding of effective practices. According to Wenger (1998), an effective CoP is built on three main principles: mutual engagement, a joint enterprise, and a shared repertoire.

As a concept of CoPs, introduced by Lave and Wenger (1991), emphasise the importance of activities in binding individuals to communities and legitimising individual practices. Wenger (2011) further states that CoPs comprise groups of people who share an interest or passion for what they do and who learn from each other to improve their practice through regular interaction. This perspective aligns with Meyer et al.'s (2014) assertion that research in systems change indicates that supporting optimal student learning requires developing supportive learning communities for educators.

For a CoP to function effectively, it must generate and appropriate a shared repertoire of ideas, commitments, and understandings. It also needs to develop various resources such as tools, documents, routines, vocabulary, and symbols that embody the community's accumulated knowledge. This process involves praxis, ways of doing and approaching things that are shared to some significant extent among members (Lave & Wenger, 1991). Lave and Wenger argue that learning should be viewed not as the acquisition of knowledge but as participation in social relationships or as co-participation in a community of practice. Participation refers to local engagement in activities and a broader process of being active participants in social communities, constructing identities in relation to these communities and building trust relationships (Wenger, 1998).

Perhaps the most significant aspect of CoPs in educational contexts is their multifaceted nature. Forlin et al. (2008) argue that whole-school community support is essential for teachers to reduce feelings of isolation and increase collaboration opportunities, which are crucial for successful inclusion

programs. They emphasise the importance of colleague support over external professional support. Recognising that CoPs affect performance is vital due to their potential to overcome the inherent problems of a slow-moving traditional hierarchy in a fast-moving virtual economy. CoPs are effective for handling unstructured problems and sharing knowledge across traditional boundaries. They also help develop and maintain long-term organisational memory, enriching individual learning and motivation to apply new knowledge (Lesser & Prusak, 2013).

In the context of inclusive practice, Pantić and Florian (2015) assert that agents of change work purposefully with others to challenge the status quo and develop social justice and inclusion. This aligns with Fullan's (2014) perspective that teacher development must actively listen to and sponsor teachers' voices, establishing opportunities for them to confront the assumptions underlying their practices and create a community of teachers who develop their purposes together over time.

The concept of the scholarship of integration offers a framework for comprehending how CoPs enable the creative synthesis of ideas from diverse sources. Within these dynamic environments, participants merge insights from various sources to enhance their understanding of content and practice (Boyer, 2016).

To fulfil Irish policy mandates, such as CÉIM (2020) and the Digital Strategy for Schools (2027), regarding Universal Design for Learning (UDL), teacher education and professional development programs must incorporate instructional experiences that cultivate both knowledge and expertise in UDL implementation (Smith et al., 2019). Teacher communities of practice offer an effective strategy for achieving this objective.

Irish policymakers identify teacher collaboration as a fundamental component of educational reform and school enhancement within inclusive and participatory learning environments. Aligned with global policy trends, the core policy document, *Looking at Our School (LAOS) 2022: A Quality Framework for Primary and Post-Primary School*, promotes a holistic, inclusive, and participatory approach to education. It recognises the significance of professional development and collaboration among teachers in

co-creating learning experiences that extend across and beyond the curriculum. Teachers contribute to building whole-school capacity through knowledge sharing. School leaders are instrumental in fostering a collaborative school culture that supports inclusive learning for all students (Moynihan & O'Donovan, 2022).

According to Wenger (2011), CoPs empower practitioners to collectively manage the knowledge they need, noting that with the appropriate structure, they are ideally positioned to achieve this. These varied communities serve multiple purposes, including professional learning, increased research productivity, enhanced instruction, and school improvement (Borko, 2004). CoPs are a persistent, sustained social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history, and experience focused on common practice and mutual enterprise Barab and Squire (2004).

CoPs produce shared practice as members engage in collective learning processes, structuring an organisation's learning potential through core knowledge development and boundary interactions (Wenger, 1998). Dewey (2014, p. 56) defines education as the “reconstruction or reorganisation of experience which adds to the meaning of experience, and which increases the ability to direct the course of subsequent experience,” highlighting the need for collective sharing of ideas based on experience. Mayne et al. (2015) emphasise that CoPs are not only places to share knowledge and practice but also to generate new forms of both. They reconceptualise the novice-expert interaction within academic practitioners and mentor-mentee relationships.

Research on professional development indicates that pre-service teachers who engage in CoPs with experienced teachers better understand the theory-practice relationship (Sim, 2006; Sutherland et al., 2005). Cotter et al. (2017) highlighted the importance of formally supporting CoPs while allowing them to develop organically. Supporting staff in nurturing and sustaining CoPs and providing training in relevant technologies are vital for continued success. Belay et al. (2022) note that professional learning communities stimulate individual and collaborative learning among teachers, cultivating professional capital within schools (Hargreaves & Fullan, 2013; Harris & Jones, 2017).

Additionally, the literature highlights several benefits of CoPs, including enhanced change management, better access to knowledge, and the promotion of trust and a shared purpose (Cotter et al., 2017). Evidence indicates that staff involved in a faculty UDL community of practice appreciated the support it provided, which led to significant program improvements and a stronger culture of collaboration (Whinnery et al., 2020). Moreover, improved teacher collaboration contributes to overall benefits, including enhanced student learning and engagement (Mercieca, 2016).

Well-developed professional learning communities have positive impact on both teaching practice and student achievement Vescio et al. (2008). In the next section the author will analyse communities of practice (CoPs) through the lens of Bronfenbrenner's (1979) Ecological Systems Theory (EST), aiming to explore the complex dynamics of educational environments and their influence on teachers' agency and professional capacity to implement UDL.

2.7.2 Ecological Systems Theory

Bronfenbrenner (1979) Ecological Systems Theory (EST) theoretical framework describes the complex interactions between individuals and their environment. According to EST, individuals are influenced by multiple nested systems that interact with each other, including the microsystem, mesosystem, exosystem, macrosystem, and chronosystem.

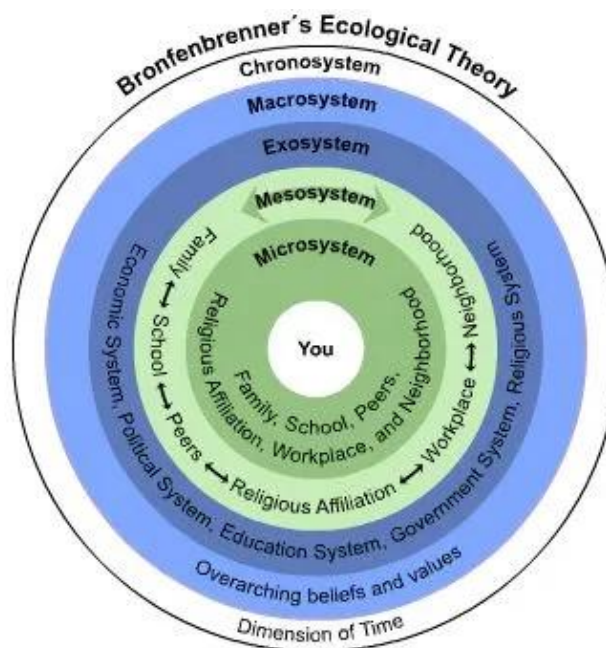


Figure 2-5 Bronfenbrenner (1979) Ecological Systems Theory (EST) theoretical framework

Teacher agency, viewed through Bronfenbrenner's ecological systems theory, provides a nuanced framework for comprehending the intricate dynamics that mould educators' roles and decision-making within educational environments. Bronfenbrenner's theory describes how individuals are influenced by interconnected systems, ranging from immediate microsystems such as classrooms and schools to broader macrosystems that encompass cultural and societal contexts (Bronfenbrenner, 1979)

Originally rooted in education and social work, Bronfenbrenner's model has expanded its applicability to fields such as Management and Organisational Psychology, illustrating how departments and units are influenced by diverse systems, which shape their operational capabilities and adaptive responses to challenges. Applying Bronfenbrenner's ecological systems theory to communities of practice (CoPs) among educators facilitates a holistic examination of the multifaceted interactions across environmental systems. This approach offers insights into how various layers of influence collectively impact the adoption, efficacy, and sustainability of UDL practices within educational settings, thereby enhancing our understanding of the interplay between systemic factors and educational outcomes. Fovet (2021) asserts that implementing UDL represents a profound and complex transformation unfolding within extensive institutional frameworks.

Applying Bronfenbrenner's model to a UDL CoP

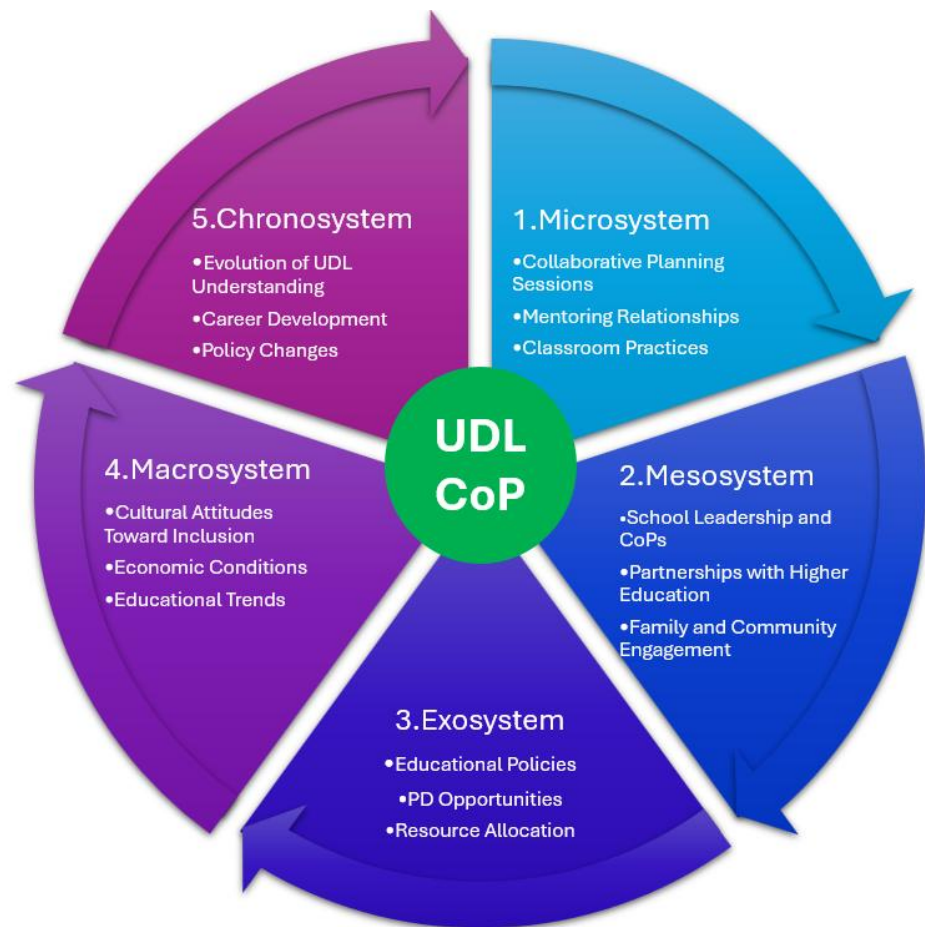


Figure 2-6 Applying Bronfenbrenner's model to a UDL CoP

1. **Microsystem** encompasses the immediate environments where teachers interact directly:
 - **Collaborative Planning Sessions:** Regular meetings where teachers within a CoP share ideas, resources, and strategies for implementing UDL. These sessions foster peer support and collective problem-solving.
 - **Mentoring Relationships:** Experienced teachers mentoring newer educators, providing guidance on UDL principles and their application in diverse classroom settings.
 - **Classroom Practices:** Teachers experimenting with UDL strategies in their classrooms and sharing feedback within the CoP, promoting iterative learning and continuous improvement.

2. **Mesosystem:** Interconnections between Microsystem Environments
the mesosystem involves the relationships between different microsystems that impact teacher CoPs:
 - **School Leadership and CoPs:** Support from school administrators who encourage and facilitate the formation and functioning of CoPs focused on UDL.
 - **Partnerships with Higher Education:** Collaboration between schools and universities to integrate UDL principles into teacher education and ongoing professional development.
 - **Family and Community Engagement:** Involving parents and community members in understanding and supporting UDL practices, creating a more inclusive educational environment.
3. **Exosystem:** Indirect Influences on Teacher CoPs, the exosystem includes broader contexts that indirectly affect teacher CoPs:
 - **Educational Policies:** National policies promoting inclusive education and UDL, which provide a framework and incentives for schools to adopt UDL practices.
 - **Professional Development Opportunities:** Availability of workshops, seminars, and online courses focused on UDL, supported by educational institutions and professional organisations.
 - **Resource Allocation:** Funding and resources provided by government and management bodies to support UDL implementation, such as access to assistive technologies and specialised training materials.
4. **Macrosystem:** Societal and Cultural Influences, the macrosystem encompasses overarching cultural and societal factors:
 - **Cultural Attitudes Toward Inclusion:** Societal beliefs and values regarding diversity and inclusion, which influence the acceptance and support of UDL practices within schools.
 - **Economic Conditions:** The broader economic environment affecting school budgets, resource availability, and the overall capacity to implement and sustain UDL initiatives.

- **Educational Trends:** Prevailing trends in educational research and practice that promote inclusive teaching methods and the adoption of UDL principles.
5. **Chronosystem:** Temporal Changes and Development, the chronosystem considers the dimension of time and changes over time:
- **Evolution of UDL Understanding:** The development of UDL theory and practices over time, including new research findings and advancements in educational technology.
 - **Career Development:** The professional growth of teachers within the CoP, including their evolving understanding and application of UDL as they gain more experience and training.
 - **Policy Changes:** Changes in educational policies and mandates over time, influencing the emphasis on and support for UDL implementation.

Applying Bronfenbrenner's theory to teacher Communities of Practice (CoPs) for UDL implementation highlights the necessity for multi-faceted professional development approaches. These approaches should address the diverse needs and experiences of teachers across various educational settings.

2.7.3 Sociocultural Theory

This section explores an approach to teachers' PD based on Vygotsky's sociocultural theory (SCT), suggesting that Vygotsky's principles on student learning in the classroom also apply to teachers' learning within communities of practice (CoPs). Given the increasing challenges in classroom environments Elmore (2004), adopting new and improved teaching methods for self-development requires teachers to have commitment and confidence in their profession. Effective PD for teachers must address their knowledge, skills, attitudes, and teaching methods. Vygotsky's theory posits that consciousness or thinking links knowledge to actions or behaviour (Lantolf & Appel, 1996). Since knowledge is believed to shape perceptions, examining teachers' discourse can help us understand their underlying perceptions and expectations. There is a growing concern that if teachers' perceptions are inaccurate, they cannot effectively plan instruction to meet students' needs

through appropriate interaction (Pelletier & Vallerand, 1996). This is particularly relevant to implementing UDL practices in the classroom, where teachers must actively design flexibility and choice to meet the needs of diverse learners.

Opfer and Pedder (2011) describes teacher learning as a complex system involving nested systems within systems. This learning is rooted in sociocultural contexts, actors, artifacts, situations, and activities, essentially context-placed or situated processes. The term “development” in teacher professional development aligns with Vygotsky’s theory of development, which highlights the importance of collaboration over time, inquiry into relevant learning objectives, trust among participants, implementation of new teaching methods, external support in developmental processes, and reflection on newly acquired practices (Burner & Svendsen, 2020).

Shulman (1986, 1987) identifies three kinds of basic knowledge essential for teachers: general pedagogical knowledge (PK), subject matter knowledge (SMK), and pedagogical content knowledge (PCK). Vygotsky’s theory posits two levels of functioning in explaining human development: the intermental plane, where social interactions occur, and the intramental plane, where knowledge and skills internalised from social interactions serve individual cognitive functions. The general genetic law of cultural development and the construct of the zone of proximal development (ZPD) encapsulate these levels (Vygotsky, 1978). Professional development must be fundamentally linked to everyday classroom activities to ensure that concepts and tools encountered socially are internalised and have a lasting effect (Eun, 2019).

The Zone of Proximal Development (ZPD), as described by Vygotsky and Cole (1978), is the gap between what learners can achieve independently and what they can achieve with guidance from adults or collaboration with more capable peers. Gauvain (2020) suggests that Vygotsky emphasised the potential for intellectual growth through social experience over individual intellectual capabilities at any given time. In the context of teachers' professional development, Warford (2011) introduces the concept of the "zone of proximal teacher development" (ZPTD), which adapts Vygotsky's ZPD specifically for teacher growth and learning. The ZPD traditionally focuses on

the distance between what learners can do independently and what they can achieve with guidance from knowledgeable others, starting with other-regulation and moving towards self-regulation. Conversely, the ZPTD begins with self-scaffolding, where teachers take the initiative to identify their learning needs, set goals, and utilise available resources to enhance their skills and knowledge. This self-directed phase encourages teachers to reflect on their practice, recognise areas for improvement, and proactively seek out professional development opportunities. As teachers progress, the ZPTD shifts towards other regulation, where external support becomes more significant. This phase involves collaboration with mentors, colleagues, and professional learning communities. Through these interactions, teachers receive feedback, guidance, and support that further refine their teaching practices. The external input helps to consolidate the self-initiated efforts, leading to more profound and sustainable professional growth.

The ZPTD framework emphasises the importance of a balanced approach to teacher development, incorporating both self-directed learning and collaborative support. This model aligns with the increasing emphasis on continuous professional development and the need for teachers to adapt to diverse and dynamic classroom environments. It recognises that effective teacher growth involves a combination of personal initiative and communal engagement, ultimately leading to improved teaching quality and better student outcomes.

Vygotsky posits the fundamental role of semiotic mediation, specifically verbal interaction, and social mediation in the learning process. Language functions as a symbolic tool, mediating higher-order cognitive processes such as reflection and learning (Swain et al., 2015). Empirical evidence shows that adults use private speech for intra-psychological purposes, particularly when faced with a difficult task, serving a mediational role in problem-solving. Collin and Karsenti (2011) proposed that teachers, besides their cognitive capacity for reflection, can benefit from verbal interactions with colleagues and peers. This highlights the interlinked nature of human cognitive and social dimensions and supports understanding how teachers develop their thinking and practice (Johnson, 2007).

Sociocultural theory emphasises the social interaction occurring during training sessions as the main mechanism for teacher development.

Collaborative learning and the role of the teacher as a facilitator of learning are crucial. The literature suggest that teachers should engage in collaborative learning activities with peers and more experienced educators to expand their knowledge and skills. Professional development activities should create opportunities for collaborative work, discussions, sharing experiences, and reflecting on practice. Scaffolding in professional development helps teachers gradually develop their knowledge and skills in a supportive environment.

The literature also suggests that since the Covid-19 pandemic thinking on cultural tools, such as technology and other resources, serve as a very functional accessible support for teachers' learning. Online learning communities and social media platforms now provide opportunities to connect teachers with peers who share similar interests and provide access to various resources and learning opportunities. Applying sociocultural theory to the classroom context shows that teachers' perceptions cannot be static; cultural historical contexts affect teachers' thinking and actions. Teachers' experience influences their behaviour and interpretation of others' behaviours (Mayer & Marland, 1997), shaping their teaching practices based on their perception of students' needs (Carpenter & Fennema, 1992). Access to a broader knowledge and experience base bring opportunities to expand teachers understanding of diversity and inclusive practices.

Professional development is the most effective way to achieve quality teaching, which significantly influences student learning outcomes (Darling-Hammond, 2016; Hattie, 2012). Teachers need to engage with culturally diverse students, which creates unprecedented demands for developing the knowledge and skills required to meet these challenges (McLaughlin, 1994; Smylie & Conyers, 1991). Stigler and Hiebert (1999) argue that teaching is the key to improved student learning, and professional development is the key to quality teaching.

2.7.4 Social Cognitive Theory

Social cognitive theory, as articulated by Albert Bandura, posits that learning occurs through observational learning within social contexts, encompassing

interactions and media influences (Bandura, 1971). Bandura's assertion that "Most human behaviour is learned observationally through modelling" underscores how individuals acquire new behaviours by observing others and modelling them in future actions (Bandura, 1971). This cognitive process of observational learning allows individuals to mentally represent observed behaviours and apply these representations to guide their own actions, thereby expanding human agency (Bandura, 2001). Individuals can acquire a vast repertoire of knowledge and behavioural skills merely by observing the behaviour of others. They then, in turn, can draw on these socially acquired capabilities to meet a range of future challenges

In educational settings, Bandura (1997) argues that teachers operate within interactive social systems where their efficacy beliefs significantly influence teaching efforts and strategies. Teachers with high efficacy beliefs are more likely to persist in implementing new teaching strategies and to persevere in the face of challenges (Bandura, 1997). Moreover, Bandura highlights the critical role of self-efficacy, which refers to individuals' beliefs in their capabilities to achieve specific goals. He identifies four sources of self-efficacy: mastery experiences, vicarious experiences, social persuasion, and emotional states, with mastery experiences being particularly influential (Bandura, 1997).

Research corroborates that teachers' efficacy beliefs shape their instructional decisions and classroom practices (Guskey, 2002; Tschannen-Moran et al., 1998). Teachers with high self-efficacy are more likely to exhibit tolerance, persistence in working with students facing learning difficulties, and openness to adopting innovative instructional methods (Allinder, 1994; Guskey, 1998).

Bandura's focus on self-regulation in learning is pivotal for comprehending how learners actively build knowledge and manage their learning processes (Bandura, 1991). Expert learners demonstrate self-regulation by establishing goals, tracking their progress, and adjusting their strategies based on their comprehension, which ultimately enhances their educational achievements (Zimmerman, 2002). This perspective resonates with the core objectives of UDL, which aims to empower students to become adept learners.

By integrating social cognitive theory into teacher development within CoPs, participants can engage in a learning environment that aligns with UDL principles, fostering a lived experience of inclusive education.

In educational practice, SCT informs strategies for fostering inclusive environments and promoting effective teaching practices. By understanding how observational learning and self-efficacy operate, educators can better support diverse learners and enhance instructional outcomes (Bandura, 1977; Deci and Ryan 2012). For instance, Deci and Ryan (2012) argue that fostering intrinsic motivation in students aligns with SCT principles, as students with high self-efficacy are more likely to demonstrate intrinsic motivation and persistence in learning tasks.

Some scholars have examined "responsibility for student learning" as a critical teacher belief that can either facilitate or impede their effectiveness in educating students (Diamond et al., 2004; Lee & Smith, 1996). These researchers argue that when teachers perceive their students as incapable of learning due to factors such as background, family circumstances, or innate abilities, they may invest less effort in teaching them effectively.

Bandura posited that self-efficacy beliefs interact synergistically with other factors within Social Cognitive Theory (SCT) to shape human thoughts, actions, and motivations. He emphasised that self-efficacy beliefs are not isolated; rather, they are intricately intertwined with other social learning constructs, evolving through experiences and reflexive processes. Bandura highlights, that perceived self-efficacy concerns not just the number of skills one possesses, but rather what one believes they can achieve with those skills in various situations.

Critically, SCT's emphasis on reciprocal determinism where behaviour, personal factors, and environmental influences interact, offers a nuanced framework for understanding and addressing challenges in education (Bandura, 1991). However, while SCT provides valuable insights, its application requires consideration of contextual factors and ongoing empirical validation in educational research (Takahashi, 2011).

Expanding on the practical implications of SCT, recent studies highlight its role in enhancing teacher collaboration and professional development (Schunk & DiBenedetto, 2020). Takahashi (2011) emphasises the importance of communities of practice in supporting teachers' efficacy beliefs through shared experiences and collaborative learning. This collaborative approach not only fosters a supportive environment but also strengthens teachers' confidence in implementing new instructional strategies.

Furthermore, the concept of social capital theory complements SCT by emphasising the importance of social networks and relationships in knowledge sharing and professional development (Putnam, 2000). Bandura's SCT posits that individuals' behaviours are influenced by their social networks, highlighting how close social interactions can enhance knowledge exchange and professional growth among educators (Bandura, 1997).

Social Cognitive Theory provides a comprehensive framework for understanding how learning occurs through social interactions, observational learning, and self-regulation. By applying SCT principles within teacher CoPs, it has the potential to enhance teaching effectiveness, promote inclusive practices, and foster environments conducive to student learning and development. This alignment lays the groundwork for Targeted Professional Development, which can further support educators in honing their skills and addressing specific areas of need in their practice.

2.8 Targeted Professional Development

PD serves as a critical mechanism for improving educational outcomes by equipping teachers with essential skills and knowledge to effectively address the diverse needs of students. Despite the increasing awareness of inclusive education's importance, many teachers express apprehensions regarding their readiness and the institutional support necessary to create truly inclusive environments. This concern emphasises the pivotal role of ongoing PD tailored to meet the specific challenges of diverse student populations.

In today's increasingly diverse educational landscapes, educators must continually update their practices with evidence-based strategies to cater to all students' needs (Shevlin et al., 2013). Ongoing professional development is

not just about imparting new knowledge but entails a comprehensive approach that supports teachers in seamlessly integrating these strategies into their daily teaching routines. By contextualising learning experiences to align with educators' and students' needs, effective PD facilitates sustained improvements in teaching and learning outcomes (Darling-Hammond et al., 2009).

Effective professional development is pivotal in equipping educators with the skills and knowledge necessary to implement UDL effectively. Despite limited documentation on UDL-specific PD, insights from existing literature underscore critical components essential for fostering meaningful change in teaching practices.

Firstly, UDL-focused PD must provide robust professional support and instruction tailored to educators' needs. Fixsen et al. (2009) emphasise that such support should not operate in isolation but should integrate seamlessly with broader educational initiatives. When PD is isolated, it risks fragmented learning experiences that lack sustainability and may fail to induce significant pedagogical shifts. Darling-Hammond and Richardson (2009) advocate for collaborative approaches to PD, asserting that these foster comprehensive school-wide improvements beyond individual classrooms. Effective PD, according to their findings, is intensive, ongoing, and deeply connected to educators' daily practice. It prioritises the teaching and learning of specific academic content, aligns with other school initiatives, and cultivates strong professional relationships among teachers.

Researchers widely agree on seven critical elements essential for effective PD: (a) content-focused training, (b) integration of active learning methodologies, (c) collaborative activities within job-embedded contexts, (d) modelling of effective teaching practices, (e) ongoing support through coaching, (f) opportunities for feedback and reflection, and (g) sustained duration (Garet et al., 2001; Darling-Hammond et al., 2009, 2017; Gillespie-Rouse and Kiuvara, 2017). These elements collectively enhance educators' capacity to implement new strategies effectively, thereby fostering improved student academic growth and engagement (Allen et al., 2011; Darling-Hammond et al., 2017).

Penuel et al. (2007) highlight a broad consensus among researchers that reform-oriented professional development is generally more effective than traditional approaches. This type of professional development, as Garet et al. (2001) explain, includes activities such as mentoring, coaching, participating in committees or study groups, and engaging in internships, which require deeper and more sustained engagement than the typical introductory workshops.

Fullan (2007) critiques the conventional notion that simply providing external ideas through workshops, courses, and programs will lead to classroom improvement. He argues that this view is flawed, even when the sessions meet high standards of adult learning. Effective professional development must go beyond transmitting new ideas; it should foster meaningful changes in teaching practices.

Teacher professional learning is inherently complex, demanding both cognitive and emotional engagement from teachers. Avalos (2011) emphasises the need for teachers to reflect on their beliefs and to explore and implement alternative strategies for growth and change. This multifaceted process is more likely to be successful when professional development is ongoing and extends over a longer duration, allowing for continuous learning and integration of new knowledge. Brown and Campione (1996) reinforce this point by noting that longer-term professional development is better suited to provide the necessary opportunities for teachers to apply and internalise new skills effectively.

Avalos (2011) further emphasises the significant power of teacher co-learning, noting that teachers naturally engage in educational discussions with each other. However, despite this tendency, classroom teaching often remains a solitary activity in many contexts. Therefore, transitioning from co-learning through conversation to co-learning through observation and feedback is both necessary and effective.

Teacher professional development is a crucial pathway to improved teaching and educational outcomes globally. This development encompasses various activities such as courses, workshops, conferences, seminars, participation in networks, collaboration, research, reading, observation, mentoring, and

coaching. Evans (2010) defines changes in teachers' practice as shifts in knowledge, understanding, skills, behaviour, attitudes, values, and convictions. Research by Darling-Hammond et al. (2009) indicates that when professional development is contextualised to practice and includes opportunities for collective development, it supports teachers' growth and enhances their teaching practices. They assert that well-designed, engaging, and meaningful professional development enables teachers to provide similar learning and development opportunities for their students.

Teachers can also learn through collaborative activities such as co-teaching, joint planning, and pedagogical discussions about students and teaching (Little, 2012; Postholm, 2012). Fullan (2007) argues that professional development must be contextualised to teachers' practice to effect changes in teaching practices. For collaborative and collective processes to be effective, the focus should be on both the structure and culture of the collaboration (Forte & Flores, 2014). Walker (2007) posits that a positive learning culture for teachers depends on the alignment of structures, values, and relationships. In this context, culture refers to the shared actions and beliefs of a group (Brown et al., 1989). Dobie and Anderson (2015) highlight the importance of an open culture that allows for constructive disagreements, which are vital for dialogues, learning, and development in teacher collaboration.

This is alluded to by Opfer and Pedder (2011) who describe professional development as part of a complex system involving individual teachers, interactions among teachers, the school system, and the school leaders. This complex system supports or impedes changes in practice. Vangrieken et al. (2017) note that teacher collaboration provides several benefits with significant impacts on their professional development, making it an essential strategy for professional growth. The OECD Teaching and Learning International Survey (TALIS) (2013) found that teachers using collaborative practices are more innovative, have higher job satisfaction, and possess stronger self-efficacy beliefs.

This emphasises the importance of involving external experts or researchers as support and collaboration partners in development activities (Widjaja et al., 2015). Stetsenko (2017) suggests that research within the post-Vygotskian framework, which emphasises practical engagement in educational practice,

can enable teachers to critically evaluate and enhance their experiences and competencies. This approach fosters a transformative stance where teachers actively envision and enact changes in their teaching practices.

Wenger (1998) argues that within a community of practice, professional learning emerges through the collective negotiation of a shared enterprise. This collaborative shaping of activities promotes mutual accountability among participants, facilitating transformative practices beyond traditional managerial forms of accountability. While communities of practice can sometimes uncritically reinforce existing discourses, they also provide powerful contexts for professional learning, where collective efforts significantly contribute to growth and change.

2.9 Gaps in the literature

UDL has emerged as a promising framework aimed at enhancing educational experiences by making learning accessible to all students. However, despite its potential, significant gaps remain in the literature regarding its implementation, efficacy, and impact across various educational settings. A closer examination reveals several areas that require further exploration.

The literature highlights an urgent need for classroom-level guidance on effectively implementing UDL. Researchers such as Edyburn and Edyburn (2015), Ok et al. (2017), and Rao et al. (2014) emphasise this necessity. Edyburn (2010) underscores the scarcity of primary research on UDL and its implications, suggesting that without a robust research base, validating UDL as an effective intervention is challenging. This gap indicates a critical need for empirical studies and practical guidelines to support educators in implementing UDL strategies effectively within their classrooms.

Another significant gap pertains to the role of teachers in implementing UDL. While Spencer (2011) and Vitelli (2015) acknowledge the importance of the teacher's role, this area remains understudied. Reynor (2020) found that inclusive practices in primary school settings could be enhanced with more support and knowledge of UDL. This highlights the need for research focusing on the specific actions and strategies that teachers across the educational

sectors in Ireland can employ to effectively integrate UDL principles into their teaching practices.

Moreover, while there is some research on UDL efficacy in higher education settings, empirical studies on its application in secondary education are lacking. Bray et al. (2023) indicate a need for further research to explore how UDL principles can be effectively applied in secondary school environments to meet the diverse needs of students. Despite growing interest in UDL as a means to reduce barriers in education, there is limited information on its integration into tertiary education policies and practices. Healy et al. (2023) highlight this gap, suggesting a need for further exploration of how UDL can be incorporated into higher education settings to promote inclusivity and accessibility for all learners.

In addition to this, there is a significant gap in in-service teacher PD related to UDL implementation. Smith et al. (2019) point out the dearth of studies examining the UDL training process within authentic school environments. This gap is critical as it impedes educators' ability to adopt UDL practices effectively, thereby limiting the framework's potential impact on inclusive education.

Although UDL holds promise for enhancing educational experiences for students with intellectual disabilities (ID), research on how educators specialising in this field are trained in UDL implementation is scarce. Best et al. (2015) suggest that this gap requires further investigation into the preparation and support provided to special education teachers regarding UDL practices.

Furthermore, despite the promise of UDL in creating accessible learning environments, there is little agreement on how to document its interventions. Meyer et al. (2014) and Pisha & Coyne (2001) discuss the potential of UDL, while Rao et al. (2014) note the lack of consensus in documenting UDL claims. This inconsistency in documentation hinders the ability to assess the effectiveness of UDL interventions, calling for standardised approaches to evaluating and reporting UDL practices (Rao et al., 2020).

Adding to the complexity, Florian (2019) highlights the lack of a universally agreed-upon definition of inclusive education. Smith & Lowrey (2017) argue

that UDL cannot be deemed effective if it does not cater to all learners, emphasising the importance of inclusivity in UDL frameworks. This ambiguity highlights the need for clearer definitions and frameworks for inclusive education and UDL implementation.

2.10 Conclusion

While UDL demonstrates significant potential as a framework for creating inclusive learning environments, substantial gaps exist in the literature regarding its implementation, efficacy, and impact across various educational settings. Addressing these gaps will require further empirical research, clearer definitions and frameworks, standardised documentation methods, and enhanced support for teacher professional development in UDL. By addressing these issues, educators and policymakers can better leverage UDL to create more accessible and equitable learning experiences for all students.

Chapter 3 Methodology

3.1 Introduction

This chapter outlines the research design and methodological framework that underpins this study. It emphasises the theoretical foundations and methodological justifications for data generation and analysis. The chapter begins by outlining the study's objectives, research questions, and the overarching research paradigm guiding the inquiry. Subsequently, it provides a detailed explanation of the research study planning and design, data generation, followed by a comprehensive account of the chosen data analysis techniques. The chapter concludes by acknowledging potential limitations of the research design and addressing ethical considerations. By investigating the development of teacher agency through participation in a cross-sectoral community of practice with targeted PD, this research endeavours to contribute to the enhancement of UDL implementation across diverse teaching contexts.

3.1.1 Study objectives

This research aimed to investigate educators' engagement in a cross-sectoral community of practice and the impact of targeted professional development on their implementation of UDL within various teaching contexts. By examining participants' perspectives on inclusive practices, their understanding of UDL and technology, and their involvement in designing and implementing UDL interventions, the study seeks to uncover the transformative potential of collaborative professional learning environments. According to Grant and Pérez (2018), for students to thrive in a student-driven, inquiry-based, and technology-integrated learning environment, educators must first experience similar transformative learning through professional development. This underscores the critical role of collaborative learning among educators.

3.1.2 Theoretical Framework

UDL represents a pedagogical framework designed to optimise learning experiences for diverse groups of students by offering flexible and inclusive instructional strategies (see Chapter Two, Section 2.5.1). This study leverages

the principles of UDL to address the challenges of learner variability in Irish educational institutions. By employing a Design-Based Research (DBR) methodology, this research aims to systematically investigate the effects of a cross-sectoral community of practice combined with targeted professional development on enhancing teacher agency and UDL implementation. This approach not only supports the practical application of UDL but also contributes to the theoretical understanding of how the integration of professional development in communities of practice can support the development of inclusive educational practice.

3.1.3 Methodology and Data Generation

The study employs a DBR methodology, which is particularly suited to investigating complex, real-world educational problems and developing practical solutions. This methodological approach allows for iterative testing and refinement of the intervention in collaboration with practitioners, ensuring that the findings are both theoretically robust and practically relevant.

The study employed a QUAL +quan mixed-methods approach, integrating predominantly qualitative data with some quantitative survey questions. QUAL +quan mixed-methods is a qualitative-dominant approach that primarily relies on a qualitative, constructivist-critical perspective in the research process, while simultaneously acknowledging that incorporating quantitative data and methods can enhance the overall effectiveness of most research projects (Johnson et al. 2007). It also aligns with the interpretivist/constructivist paradigm that frames this study.

Quantitative data provided in the surveys gave an objective snapshot of participants' demographic, educational profiles, knowledge, attitudes, and practices related to UDL enabling the establishment of baseline measures (Bryman, 2016). In contrast, qualitative data, gathered through surveys, interviews, self-reports, and reflexive journals, facilitated an in-depth exploration of participants' lived experiences and the processes of meaning-making in their professional lives. This qualitative insight is crucial for understanding teacher agency, as it reveals the dynamic interplay between individual agency and structural constraints (Priestley et al., 2015). By

comprehending these nuanced experiences through the iterative survey process, the study's author could design and adapt interventions that effectively supported the professional development and empowerment of participants.

This mixed methods approach allows for a more comprehensive understanding of the research context.

3.1.4 Data Analysis

Data analysis was conducted using a reflexive thematic analysis approach for qualitative data, allowing for the identification of key themes and patterns in educators' experiences and perspectives. Quantitative survey data was analysed using descriptive statistical analysis methods to measure changes in teachers' knowledge, attitudes, and practices related to UDL. This dual approach ensures that the findings are both deeply contextualised and broadly generalisable. By triangulating data from multiple sources, the study aimed to provide a comprehensive understanding of the impact of the cross sectoral CoP and targeted professional development on teacher's ability to implement UDL within their educational settings to support diverse learners.

3.1.5 Limitations and Ethical Considerations

Potential limitations of the study include the self-reported nature of some data, which may be subject to bias, and the limited generalisability of findings due to the specific context of the Irish educational system. To mitigate these limitations, the study employs multiple data sources and methodological approaches to enhance validity and reliability, alongside a reflexive orientation following Braun and Clarke's Reflexive Thematic Analysis (RTA). Ethical considerations include ensuring informed consent, protecting participants' confidentiality, and addressing any power dynamics between the researcher and participants. Ethical approval was obtained from the Trinity College Dublin review board, and all procedures complied with established ethical guidelines.

3.1.6 Research Questions

1. How effective is a cross sectoral (primary, post primary and further education) Universal Design for Learning (UDL) community of practice in supporting the development of a UDL implementation model?

2. To what extent does including targeted professional development as part of a cross sectoral community of practice build teacher capacity to implement a UDL implementation model at whole school/centre level?
3. To what extent can a Universal Design for Learning (UDL) implementation model increase Irish educators ' ability to proactively support learner variability and diversity?

3.2 Research Paradigm

The author critically examined several theoretical paradigms before employing constructive interpretivism as the guiding framework for this study. This process included an in-depth evaluation of four alternative approaches: positivism, critical theory, phenomenology, and grounded theory. While each paradigm offered valuable insights and methodological strengths, none aligned as comprehensively with the study's aim of understanding teacher agency in the implementation of UDL within inclusive education contexts.

Positivism relies on objective, measurable data and seeks generalisable truths. While this approach holds merit in producing statistically significant findings, it was deemed insufficient for capturing the deeply subjective, context-dependent, and nuanced nature of teacher agency. Agency, being rooted in individual beliefs, interpretations, and responses to diverse classroom contexts, could not be fully understood through quantifiable metrics alone.

Critical theory was also explored, particularly for its emphasis on uncovering power dynamics, systemic inequalities, and structural barriers that shape professional practices. While this lens provided valuable insights into the institutional and systemic constraints teachers face, it was found to overly emphasise structural issues, potentially overshadowing the nuanced, individual, and context-specific meaning-making processes central to agency. The study required a balance between understanding these macro-level influences and examining micro-level interpretations and practices, which critical theory could not fully accommodate.

Phenomenology was another paradigm considered, given its focus on exploring lived experiences. It aligned well with the goal of understanding

teachers' personal and professional experiences as they navigate UDL implementation. However, phenomenology was ultimately deemed less suitable because it emphasised the essence of individual experiences without fully addressing the broader social, cultural, and institutional contexts in which those experiences were constructed, contexts integral to understanding teacher agency.

Grounded theory also presented a compelling option, particularly for its rigorous approach to generating new theories grounded in data. However, its focus on theory development did not align with the primary goal of interpreting and understanding existing constructions of teacher agency within the framework of UDL implementation. The study was not aimed at producing a new theoretical model but rather at deeply exploring the ways teachers negotiate their roles and practices in specific educational contexts.

Epistemological considerations further informed the selection of the constructivist interpretive paradigm. Epistemology is concerned with the nature and forms of knowledge (Cohen et al., 2018). Epistemological assumptions are concerned with how knowledge can be created, acquired, and communicated; in other words, what it means to know. Guba and Lincoln (1994) explain that epistemology asks the question, what is the nature of the relationship between the would-be knower and what can be known? Patton (2002) argues that epistemology is based on 'practical understandings' of concrete, real-world issues. It is for this reason that the author chose to situate the study within the constructivist interpretative paradigm to determine and understand the multifaceted issues of inclusive practice in the classroom and the implementation of a UDL solutions through the lens of teacher agency. The use of DBR as the study methodology is to ensure as Brown (1992, p. 143) states, that "an effective intervention should be able to migrate from our experimental classroom to average classrooms operated by and for average students and teachers, supported by realistic technological and personal support".

Capturing educators understanding of inclusive practice and their attitudes to the lived experience of implementing UDL in their teaching can only be done through a social constructivist approach. By adopting this approach, the

author hoped to elicit rich data via mixed methods that would allow them to interpret the complex social world in which educators work. The author is committed to interpreting teachers' attitudes and actions to assess the viability and sustainability of UDL as a framework that ensures all students in the Irish educational system receive a meaningful and equitable learning experience. The research design aims to foster a socially responsible environment where the relationship between the participants and the researcher is collaborative rather than hierarchical, conducting research with, rather than on, the community (Widianingsih & Mertens, 2019). By integrating critical realist thinking as suggested by Braun and Clarke (2019) with a constructivist interpretative approach, the study offers a comprehensive analysis of both the underlying structures influencing social phenomena and the subjective meanings individuals attach to their experiences. This combination enriches the understanding of complex research problems by considering both objective realities and personal interpretations within the framework of interpretivism theory.

3.2.1 Interpretivism Theory

Employing interpretivism as the research paradigm in a UDL study aimed at enhancing teacher agency in implementation provides several notable benefits. For interpretivists reality is not 'out there' to be discovered as 'fact', but a construct in which people understand reality in different ways (Hughes & Morrison-Saunders, 2002). One of the primary benefits of interpretivism is its emphasis on understanding subjective experiences. This approach allows researchers to investigate how teachers perceive and experience the implementation of UDL principles, revealing insights into the personal and contextual factors that influence their practices (Priestley et al., 2015). By capturing these subjective experiences, interpretivist research provides a richer, more nuanced understanding of teacher agency in UDL contexts. Interpretivism is also particularly sensitive to context, which is crucial for UDL studies given the variability in educational settings, resources, and student populations. This paradigm enables researchers to explore how different contexts impact UDL implementation, providing detailed insights that can inform context-specific support and professional development (Creswell & Poth, 2016). Such contextual sensitivity ensures that the findings are relevant

and applicable to diverse educational environments, enhancing the practical usability of the research.

Another significant advantage of interpretivism is its focus on meaning-making processes. This approach examines how teachers understand and interpret UDL principles, and how these interpretations influence their teaching practices and agency (Schraw & Olafson, 2008). By exploring these cognitive and emotional processes, interpretivist research can uncover the underlying dynamics that drive effective UDL implementation, offering deeper insights into how teachers construct and apply their knowledge in practice.

The flexibility and depth provided by interpretivist methodologies, such as interviews, surveys, and observations, are also crucial. These methods allow for the capture of complex, dynamic data in real-time, providing rich, detailed accounts of teachers' experiences with UDL (Merriam & Tisdell, 2016). This level of detail is essential for understanding the multifaceted nature of UDL implementation and the various factors that influence teacher agency.

Furthermore, interpretivism aligns well with the principles of UDL, which emphasise diversity, equity, and inclusion. By valuing and exploring diverse perspectives and experiences, interpretivist research contributes to a more inclusive understanding of UDL implementation. This alignment helps ensure that the research process and findings are consistent with the ethos of UDL, promoting more equitable educational practices (Capper, 2018).

It is important at this stage of the study design to highlight that while constructive interpretivism offers a valuable framework for understanding the complex, context-specific nature of teacher agency, it is not without its limitations. One key challenge is the issue of subjectivity and bias. The reliance on subjective interpretations from both participants and the researcher introduces the possibility that personal biases could influence the findings. These biases may shape the analysis, potentially affecting the validity and reliability of the results. Another limitation is the issue of generalisability. Constructive interpretivism's focus on in-depth, context-specific insights can make it difficult to apply the findings to broader populations. While this approach provides a rich understanding of specific situations, it complicates efforts to develop generalisable frameworks or universal guidelines,

particularly when attempting to extend the findings across different educational sectors. Additionally, the iterative, dialogic nature of this approach is time and resource intensive. Researchers must invest significant effort in building trust, facilitating meaningful participation, and analysing complex qualitative data, which can be demanding both in terms of time and resources. Furthermore, in contexts like cross-sectoral communities of practice, the diversity of participant perspectives can create challenges in constructing shared meaning. Balancing conflicting viewpoints and ensuring equitable representation require skilled facilitation and structured methodologies, which may not always be achievable. Finally, constructive interpretivism places a heavy emphasis on researcher reflexivity to address biases and ensure ethical practices. While reflexivity is crucial, maintaining it throughout the study, especially in longitudinal research, can be challenging as the researcher's perspectives evolve over time. These limitations, while not insurmountable, require careful consideration when employing constructive interpretivism as a methodological approach

In the authors view the theoretical foundation of interpretivism supports the exploration of participants' worldviews and positionalities. Interpretivism is described as a more 'people-centred' approach, acknowledging that the research environment and participants mutually influence each other's perceptions and understandings (Brundrett & Rhodes, 2014). It posits that reality and truth are not external facts to be discovered but are constructed through individual and collective understanding (Schwandt, 1994). This perspective aligns with the subjectivist epistemology that recognises knowledge as a product of personal experience and insight (Grix, 2019). In this context, DBR becomes a fitting methodology, as it supports the iterative exploration and refinement of practices in real-world settings, capturing the unique voices and perspectives of participants (Heron & Reason, 1997).

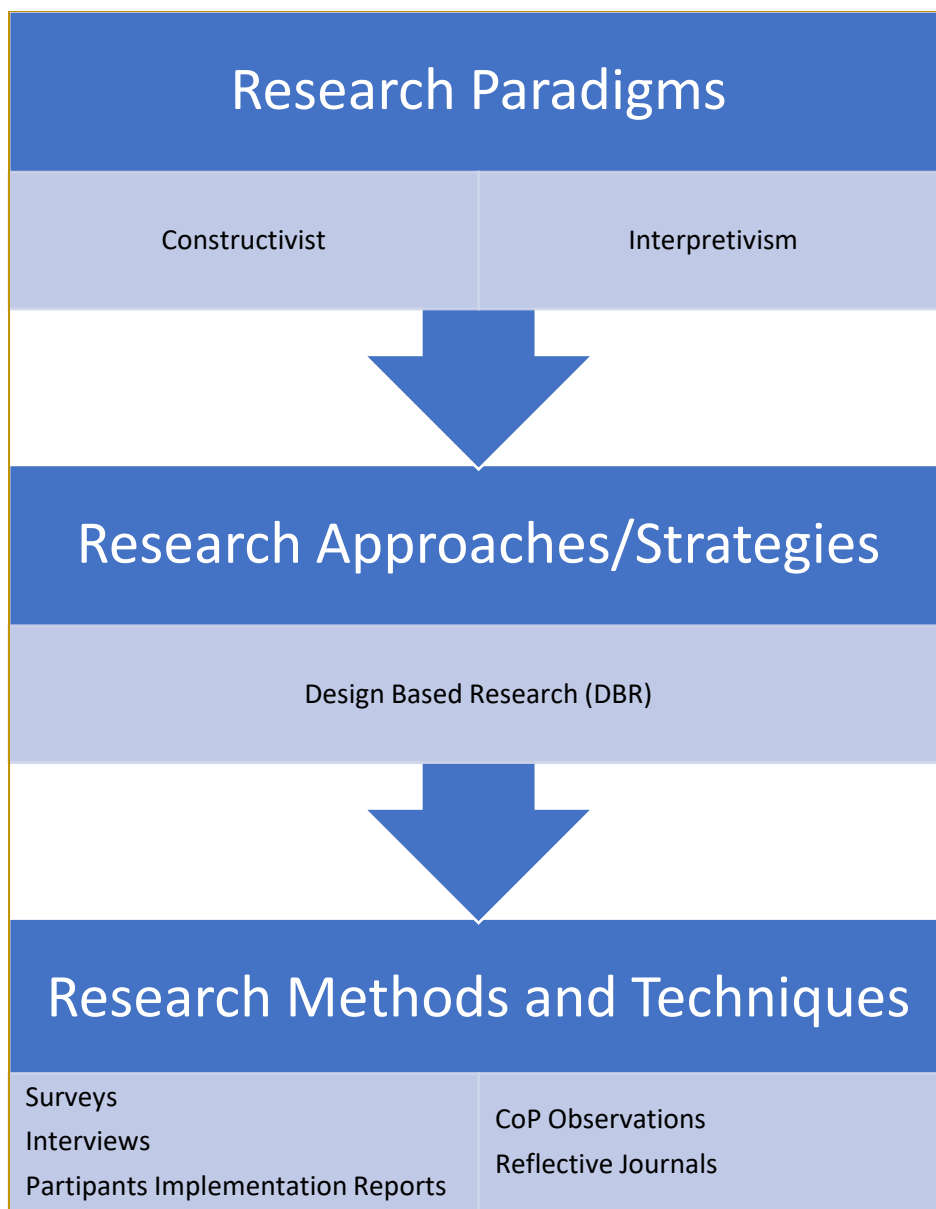


Figure 3-1 Adapted from the Information Science research methodological landscape (Cecez-Kecmanovic, 2011)

3.2.2 Constructivist Theory

Dewey (2014, p. 167) posits, “Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning naturally results.” This principle underscores Dewey’s recognition that the internalisation of new meanings, values, and attitudes within schools occurs only when these elements are actively integrated into and demonstrably supported by authentic, real-world contexts. In developing communities of practice for educators, this quote emphasises the critical importance of

engaging educators in authentic and meaningful activities that require critical thinking and problem-solving skills.

Building on this foundation, established theories of learning-as-participation (Dewey, 1916; Lave & Wenger, 1991; Bandura, 1969; Vygotsky & Cole, 1978) underscore the essential role of experiential learning and active engagement in the educational process. Dewey (1916) laid the groundwork for experiential learning, advocating for educational experiences rooted in practical activity and reflexive thinking. Lave and Wenger (1991) further expanded on this by introducing the concept of communities of practice, where learning occurs through active participation in social contexts. Bandura's social learning theory (1986) highlighted the significance of observing, modelling, and imitating behaviours, attitudes, and emotional reactions, emphasising the importance of social contexts in learning. Vygotsky and Cole (1978) added that learning is a socially mediated process, where knowledge is constructed through interaction with others.

Drawing on these theoretical frameworks (see Chapter 2 section 2.7 for more detail), this study was structured with three equally important components: the community of practice, targeted professional development, and participant-led UDL implementations. The community of practice allowed research participants to explore their understanding of UDL not only within their own contexts but also through the shared experiences of others in the group. According to Vygotsky (1978), learning transpires through social interactions, and knowledge is constructed within these social contexts. This aligns with Lave and Wenger's (1991) notion that learning is inherently social and best facilitated through communities of practice.

The community of practice in this study became the nucleus of real learning, where participants deepened their understanding of UDL and experimented with its implementation in their own educational environments. Participants began to perceive UDL as a dynamic journey, questioning and exploring its application at various stages of the education system. This iterative process, akin to Bandura's (1969) social learning theory, allowed participants to push

the boundaries of their project implementations, exceeding the expectations of the study's author.

By embedding the principles of UDL within the community of practice, participants experienced UDL firsthand, fostering a deeper investment in its application within their teaching and learning contexts. This experiential learning approach aligns with Dewey's (1916) advocacy for learning through doing and Bandura's (1969) emphasis on learning through observation and interaction. The study also embraced a constructivist approach, where learning is seen as an active, social process (Vygotsky & Cole, 1978) and promoted social justice by ensuring that UDL was implemented with participants, rather than for them. This participatory approach ensures that educational experiences are co-constructed, resonating with constructivist theory and principles of social justice.

Chung (1991) identifies four basic characteristics of constructivist learning environments, which must be considered when implementing constructivist instructional strategies: (1) knowledge is shared between educators and students; (2) authority is shared between educators and students; (3) the teacher acts as a facilitator or guide; and (4) learning groups consist of small numbers of heterogeneous students. These characteristics are vital in creating an inclusive and effective learning environment.

The primary aim of UDL is to cultivate expert learners, individuals who possess a deep understanding of their learning processes and requirements for success, extending beyond traditional notions of academic achievement. Student success is influenced not only by the students and educators but also by the wider educational structure. By applying the principles of UDL to the project design participants had an opportunity to engage with learning in a flexible and meaningful way. This approach recognised the multifaceted and complex learning and teaching environments in which participants worked and highlighted to them the need for flexible design to support their individual needs and the needs of the group.

3.2.3 The Rationale for Design-Based Research (DBR)

As has been identified in Chapter Two the literature consistently highlights the urgent need for guidance at the classroom level on how to effectively

implement UDL (Edyburn & Edyburn, 2015; Ok et al., 2017; Rao et al., 2014). Edyburn (2010) emphasises the dearth of primary research on UDL and its implications, suggesting that without a robust research base, the validation of UDL as an effective intervention becomes challenging. This gap in the literature indicates a critical need for empirical studies and practical guidelines to support educators in implementing UDL strategies effectively within their classrooms.

In the field of educational research, selecting an appropriate implementation framework is crucial for the successful realisation of interventions designed to enhance teacher agency. Among the methodological frameworks considered in this study were Design-Based Research (DBR), the EPIS (Exploration, Preparation, Implementation, Sustainment) framework, and the Consolidated Framework for Implementation Research (CFIR). DBR emerged as the most suitable for investigating the development of teacher agency through a cross-sectoral community of practice underpinned by targeted professional development.

DBR is characterised by its iterative cycles of design, enactment, analysis, and redesign. This framework prioritises a collaborative relationship between researchers and practitioners, ensuring interventions are both theoretically grounded and contextually relevant. The iterative nature of DBR facilitates continuous refinement in response to emergent data, a critical component in fostering teacher agency. By actively engaging teachers in the research process, DBR empowers them to assume ownership of their professional growth and to adapt their practices, accordingly, thereby enhancing their professional efficacy (Wang & Hannafin, 2005).

In contrast, the EPIS framework offers a phased approach encompassing exploration, preparation, implementation, and sustainment. This comprehensive model defines specific actions and considerations for each phase, from needs assessment to long-term impact (Aarons et al., 2011). While EPIS provides a structured approach, its linear progression may not adequately capture the dynamic and iterative processes inherent in developing teacher agency across diverse educational contexts. Furthermore,

the substantial resource allocation required for the complete implementation of EPIS may limit its practical utility.

The CFIR provides a detailed and systematic approach to comprehending implementation factors across various contexts. CFIR's five domains Intervention Characteristics, Outer Setting, Inner Setting, Characteristics of Individuals, and Process offer a comprehensive lens for identifying potential barriers and facilitators (Damschroder et al., 2009). However, the framework's complexity and extensive array of constructs may impede its practical application, particularly in studies focused on enhancing teacher agency through iterative and adaptive processes.

Due to a combination of the following characteristics, DBR emerged as the preferred framework for this research.:

1. **Iterative and Adaptive Design:** DBR's cyclical nature enables continuous refinement of professional development supports in response to feedback from participants and other stakeholders. This adaptability is essential in a cross-sectoral community of practice characterised by diverse perspectives and evolving needs (Wang & Hannafin, 2005).
2. **Collaborative Approach:** DBR emphasises a collaborative partnership between researchers and practitioners, fostering a sense of ownership and agency among participants. By involving participants in the design and implementation process, DBR supports the development of contextually responsive professional development initiatives (The Design-Based Research Collective, 2003).
3. **Contextual Relevance:** The conduct of DBR within authentic educational settings ensures the development of contextually relevant and practical interventions. In a cross-sectoral community of practice, this contextual alignment is crucial for addressing the unique challenges and opportunities of different educational sectors (Collins et al., 2016).
4. **Integration of Theory and Practice:** DBR's dual emphasis on theoretical advancement and practical application aligns with the overarching goal of enhancing teacher agency. By iteratively refining professional development supports and clarifying the underlying mechanisms, DBR

contributes to both theoretical knowledge and practical improvement (Anderson & Shattuck, 2012).

5. **Flexibility in Implementation:** DBR's flexibility accommodates a variety of strategies and tools, such as targeted professional development and collaborative learning experiences within the community of practice. This adaptability is essential for responding to the heterogeneous needs of participants across different sectors, ensuring the efficacy and relevance of professional development (Barab & Squire, 2004).

As previously stated in Chapter Two section 2.4.2, Fullan (2014) observed that effective implementation consists of alterations in curriculum materials, instructional practices, behaviour, beliefs and understandings on the part of educators involved in given innovations. UDL implementation, therefore, can be viewed as a process of iteration, not a set of rigid steps to follow.

While the EPIS and CFIR frameworks offer valuable contributions to implementation research. It is the need for practical guidance and support for educators in implementing UDL strategies that has led the author to employ DBR as the research methodology in this study. Brown (1992) argues that if researchers believe that context matters in terms of learning and cognition, research paradigms that simply examine these processes as isolated variables within laboratory or other impoverished contexts of participation will lead to an incomplete understanding of their relevance in more naturalistic settings. Bradley and Reinking (2011) echo this sentiment, expressing dissatisfaction with conventional educational research approaches that, while documenting contextual complexities, often fail to address how educators can manage these factors to implement instructional interventions effectively and efficiently. At the core of DBR's efficacy and coherence is its emphasis on generating knowledge forms that go beyond positivistic truth claims. Instead, DBR prioritises the identification of patterns, heuristics, and tentative generalisations. This approach to inquiry may diverge from conventional positivist science or ethnographic methods and instead align more closely with pragmatic lines of inquiry, where theories are evaluated not based on their claims to absolute truth, but on their effectiveness in practical application. As Dewey (1938) argued, the pursuit of knowledge is inherently tied to its actionable potential. DBR constitutes a methodological framework conceived

by and for educators. Its core objective lies in enhancing the influence, dissemination, and application of educational research findings to cultivate improved pedagogical practices. Additionally, DBR highlights the significance of theory construction and the development of design principles. These principles serve to guide, inform, and refine both educational practice and research endeavours within specific educational contexts (Anderson & Shattuck, 2012).

McKenney and Reeves (2019) state that DBR places emphasis on collaboration, iteration, and the development of practical solutions within authentic educational settings. Recognising the complexity of integrating UDL principles into everyday teaching practices, DBR provides a structured and systematic approach to designing, implementing, and refining interventions. By engaging in cycles of planning, enactment, and reflection, DBR allows for the iterative development of strategies that are both contextually relevant and empirically grounded.

In the wider context many developing countries aim to improve education quality by promoting learner-centred pedagogy as part of system-wide reform. However, numerous studies reveal a gap between policy intentions and actual practice, highlighting the limitations of uncritically adopting 'best practices' from other contexts (Di Biase, 2020). To address this, DBR was chosen as an interventionist approach to investigate the conditions under which educators can develop the knowledge, skills, and agency needed to design and implement UDL strategies for effective inclusive teaching. The participatory approach inherent in DBR was utilised in the study to enhance the contextual appropriateness and effectiveness of UDL implementation and design.

In light of international targets such as the Education For All Goals and the Sustainable Development Goals (SDG). Ireland, like many other countries, seeks to improve the quality of inclusive education by promoting UDL to support diverse learner needs and is exploring how to embed UDL in system-wide reforms. van den Akker (2002) advocates for DBR in educational development, especially in developing countries, due to its context-specific focus, flexibility, and capacity-building potential. Rogan and Grayson (2003)

note that policymakers and politicians often concentrate on the 'what' of desired educational change while neglecting the 'how.'

DBR aims to understand how, why, and under what conditions interventions work in real-world contexts (McKenney & Reeves, 2019). Within this research-practice relationship, DBR focuses on developing usable knowledge and making theoretical contributions valuable to those outside the immediate setting (McKenney & Reeves, 2012).

The dynamic nature of DBR aligns with the ongoing evolution of educational contexts, ensuring that the implementation of UDL remains responsive to the changing needs of students and teachers. As UDL involves a shift in instructional design towards greater flexibility and inclusivity, DBR provides a methodological framework that facilitates the exploration and refinement of these transformative practices within the complexities of real-world classrooms.

Barab and Squire (2004) make a strong case for the importance of both theoretical advancement and practical impact in DBR. They argue that focusing solely on theory development isn't enough. To truly justify the value of the design, researchers also need to demonstrate a positive impact on learning within the specific context of the study.

Anderson and Shattuck (2012) highlight a significant strength of DBR within educational settings, particularly in primary and post primary environments. They emphasise DBR's capacity to actively engage participants in the research process, contrasting with traditional methods that often treat participants solely as research subjects. In their 2019 study, Lock et al. provided a nuanced exploration of the complexities involved in developing an online orientation environment informed by UDL. By employing DBR methodologies, they demonstrated how iterative, evidence-based practices could enhance both the design process and engagement with UDL principles, ultimately enriching the orientation program. Similarly, Mackey et al. (2023b) highlighted the efficacy of DBR methodologies in tackling intricate issues such as the development of effective inclusive collaborative teacher education. The study highlights the increasing trend among researchers to apply DBR during the preliminary phases of research to refine interventions prior to their

implementation in more rigorous experimental settings (Gersten et al., 2000). This approach is particularly valuable as DBR offers the potential to bridge the gap between theoretical frameworks and practical educational applications (Bakker & van Eerde, 2015).

3.2.4 Applying Design Based Research (DBR) to the study

DBR originates from educational technology research and shares methodological similarities with design research in engineering, computer science, and architecture. According to McKenney and Reeves (2019), the educational design research process is characterised by its adaptability, collaboration, contextual relevance, flexibility, goal-orientation, grounding in practice, integrative nature, interactivity, interventionist stance, iterative cycles, methodological inclusivity, multilevel approach, pragmatic focus, process orientation, theoretical foundation, transformative potential, and utility-orientation.

Barab and Squire (2004) conceptualise DBR as a set of approaches aimed at generating new theories and practices that significantly impact learning and teaching within naturalistic settings. A core principle of DBR is its commitment to addressing real-world educational challenges in partnership with practitioners (Wang & Hannafin, 2005). In this study, the author collaborated directly with participants to design research-informed learning experiences within the CoP to subsequently support them to examine the impact of their own UDL implementation on their student learning outcomes. DBR researchers adopt an interventionist approach, working closely with educators to comprehend and address complex practical problems. This involves the collaborative design, development, implementation, and evaluation of research-informed innovations within authentic learning environments. Educational design research is intentionally structured to investigate and respond to the complex realities of teaching and learning contexts, rather than simplifying or overlooking these complexities (McKenney & Reeves, 2019). That is why within the study it was important to have cross sectoral representation to ensure the validity and transferability of UDL implementation that examined UDL as a whole of life intervention as opposed to an individualised sectoral approach. This approach ensures that the findings

and innovations generated are both practically relevant and theoretically robust, fostering transformative improvements in educational practice.

Brown (1992) defined design research as possessing five primary characteristics that differentiate it from conventional design or research processes. First, a design is engineered within an authentic, working environment, ensuring its relevance and applicability. Second, the development of both research and design is influenced by a specific set of inputs, which includes the classroom environment, the roles of educators and students as researchers, the curriculum, and the available technology. Third, the design and development process are iterative, encompassing multiple cycles of testing, revision, and further testing to refine and improve the outcomes. Fourth, the design research process yields an assessment not only of the design's quality but also of the effectiveness of the design itself and its theoretical foundations. Finally, the overall process aims to contribute to the existing body of learning theory, enriching scholarly discourse and practical application in educational contexts.

The study is firmly grounded in McKenney and Reeves' (2019) model for conducting design research in Education. This model consists of three phases:

1. Analysis and Exploration
2. Design and Construction
3. Evaluation and Reflection

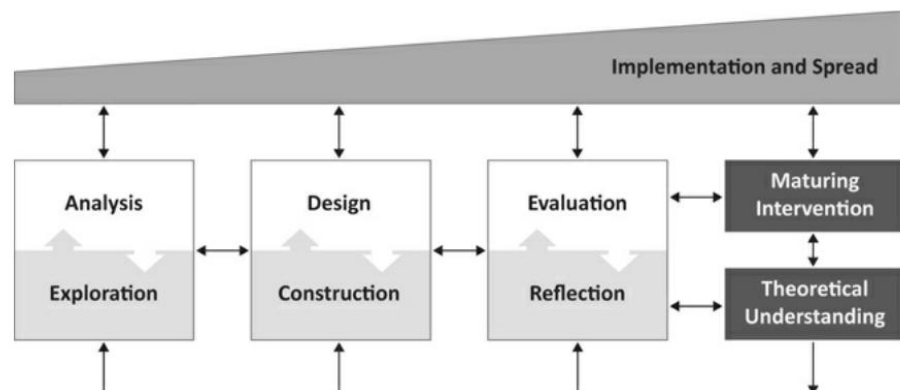


Figure 3-2 McKenney & Reeves (2019) model for conducting design research in Education

Analysis and Exploration: In addressing the complexities of UDL implementation, it is essential to first identify and diagnose the underlying problems effectively. As Dewey (1938) aptly observed, “A problem well stated is a problem half solved”. Therefore, the research centred on examining the development of teacher agency to successfully design and develop UDL implementations within their educational settings. This phase entailed an extensive review of research literature on the landscape of inclusive educational practice, the role of teacher agency, CoPs and targeted PD (see Chapter 2), to enhance the implementation of UDL principles to foster inclusive learning environments across diverse student populations. The Exploration phase involved collaborative engagement with school-level and senior management within Kerry ETB. This collaborative effort was pivotal in gaining insights into current educational practices and understanding why and how UDL implementation was strategically aligned with their organisational goals. Central to this stage was the identification of both short- and long-term objectives for the design solution. For instance, their goals included the development of innovative UDL pedagogical strategies and enhancing educators' proficiency in educational technologies. For the purpose of this research study the author chose to create a community of practice as opposed to a professional learning network. A community of practice shares a number of common characteristics with professional learning communities, but typically the scope of a CoP is more tightly focused, membership is more defined, and the role of the facilitator is to encourage participation, support the building of knowledge, and capture success stories. Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger, 2011). Due to the COVID-19 pandemic restrictions from 2020 to 2023, educators across all levels of the Irish education system embraced online platforms for teaching, learning, and collaboration (Perry, 2022). This transition to online spaces familiarised educators with video meetings, shared online workspaces, and participation in virtual communities. Capitalising on this shift, the study innovatively explored the concept of online collaborative learning spaces and virtual communities of practice as effective virtual meeting and sharing spaces. This approach presented a practical solution to

the logistical challenge of bringing together 29 educators from across a geographical radius of 4,807 km² on a weekly basis. Specifically, these virtual platforms facilitated ongoing collaboration among participants from three sectors of education within Kerry ETB, aimed at collectively advancing their understanding and implementation of UDL.

Design and Construction: During the Design and Construction phase of the study, the author carried out a thorough evaluation of existing UDL and inclusive practices within Kerry ETB and examined their expectations of the anticipated impact of their educator's participation within the project. This phase aimed to identify challenges and propose solutions, with a focus on developing an intervention that could be rigorously tested and effectively implemented and evaluated. Critical to the study's progression was securing buy-in from management and the ongoing support of the educational technology officer within Kerry ETB. As an external researcher, having an informed insider to provide context and guidance proved invaluable in navigating organisational dynamics and ensuring alignment with Kerry ETB's strategic objectives.

In response to the identified need to enhance teachers UDL pedagogical practices and technology competencies, the study proposed a comprehensive approach. This included providing expert training over a two-year period, coupled with the establishment of a CoP. Throughout the Design and Construction phase, collaborative efforts with key stakeholders in Kerry ETB were crucial. It supported the author in refining the study's foundational concepts and developed detailed guidelines for implementing the intervention.

The Construction Phase: During the Construction phase, the study moved from conceptual design to practical implementation of the intervention. The author prioritised embedding UDL principles throughout the design process, focusing on providing multiple means of engagement, representation, and action and expression. This approach was foundational to ensuring inclusivity and accessibility in the educational practices being developed.

In designing the study, the author initially outlined a basic structure but deliberately postponed finalising details until the participants joined the study. This allowed for a collaborative process where the practical aspects of the intervention could be negotiated and refined based on the insights and expertise of the educators involved. This participatory approach was crucial in tailoring the intervention to meet the specific needs and contexts of the participants within Kerry ETB.

Central to UDL is the notion of learners as expert learners, emphasising that learners should understand how they learn best and have the ability to advocate for their own learning needs. By involving participants in the co-creation of the study's design, the author aimed to foster a sense of ownership and empowerment among participants. This collaborative effort not only ensured that the intervention was responsive to the diverse needs of participants but also laid the groundwork for a sustainable UDL CoP ecosystem within Kerry ETB.

Ultimately, by integrating UDL principles and engaging participants in the design process, the study sought to cultivate an environment where educational practices could continually evolve and adapt to support all participants effectively. This iterative approach reflected a commitment to promoting inclusive education and enhancing the professional development of educators within Kerry ETB.

3.2.5 Rigour in DBR

This DBR study focused on developing educators understanding of inclusive practice and the application of UDL in their teaching. It required a rigorous and systematic approach to ensure the validity, reliability, and trustworthiness of the research. Rigour in a DBR study involves maintaining a high standard of quality in the research design, data collection, analysis, and interpretation. This comprehensive approach is essential to produce findings that are robust, credible, and applicable to educational practices.

The foundation of rigour in a DBR study is established through a clear and well-defined research design. The author formulated specific research objectives, guiding questions, and hypotheses that align with the focus on

teachers' understanding and implementation of UDL. This design served as a comprehensive roadmap for data collection and analysis, incorporating relevant theoretical frameworks and tailoring them to the unique characteristics of DBR. A transparent and explicit research design not only enhanced the rigour of this study but also ensured that the outcomes can contribute meaningfully to both theory and practice in the implementation of UDL in the Irish education context.

DBR emphasises collaboration between the researcher and the study participants. To ensure rigour, the author actively involved participants and other stakeholders within Kerry ETB throughout the research process. This collaborative approach helped in refining the research questions, designing interventions, and interpreting findings. By incorporating diverse perspectives, the research became more contextually relevant and applicable to real-world educational settings. The study stakeholder's engagement fostered a sense of ownership among participants, promoting the authenticity and sustainability of UDL practices within the learning environments. It also adds rigour by validating the alignment of research objectives with the practical needs and experiences of educators.

DBR is distinguished by its iterative cycles of design, implementation, and refinement, emphasising a commitment to continuous improvement through systematic feedback and reflection. This methodological approach ensures rigour by allowing researchers to refine interventions, strategies, and tools across multiple iterations, thereby enhancing the overall quality of research outcomes. The iterative process is integral to DBR, as it involves revising designs based on empirical evidence gathered during enactment (Anderson & Shattuck, 2012). According to Campanella and Penue (2021), it is through this iterative refinement and documentation that both design efficacy and theoretical understanding are advanced.

In the context of the study, the author's acknowledgment of the evolving nature of teaching practices and UDL implementation was pivotal. By integrating iterative cycles into the study design, the research effectively captured the dynamic nature of support required to foster teacher agency in UDL contexts. This iterative process not only supported the study's

adaptability and responsiveness but also contributed significantly to its rigour. Literature indicates that DBR is particularly suited for interventions aimed at addressing emerging goals that may not align with existing standards or practices (Cobb, et al., 2003; Shaffer & Squire, 2006). Armstrong et al. (2022) further supported this view by demonstrating that DBR facilitates the development of knowledge through a collaborative and iterative research process. This knowledge is categorised into tangible, practical outcomes and in tangible, theoretical insights. A defining feature of DBR is its flexibility, allowing researchers to adapt interventions based on ongoing evidence and context-specific needs, thus ensuring that the final outcomes are prioritised over the process itself.

This DBR study leveraged multiple methods of data collection to provide a comprehensive examination of teachers' understanding and implementation of UDL. Combining qualitative and quantitative data sources, including, surveys, interviews, reflexive journals, and self-reporting, allowed for triangulation and a more holistic perspective.

Qualitative methods offer insights into the nuances of educators' beliefs and experiences with UDL implementation, while quantitative data provides measurable indicators of UDL implementation and its impact. The synergy between these methods strengthens the validity and reliability of the research findings.

This DBR study extends to ethical considerations in the treatment of the participants. The author prioritised the well-being, privacy, and confidentiality of all the participants involved in the study. This included obtaining informed consent, ensuring anonymity and confidentiality, and maintaining transparent communication about the purpose and potential impact of the research. Ethical considerations also involve respecting the autonomy of participants, particularly when they were designing their UDL interventions. Any changes to teaching practices were made collaboratively, with educators having agency in decision-making processes. This ethical stance adds a layer of trustworthiness to the research.

Analysing the data systematically is a critical aspect of rigour in a DBR study. The use of rigorous qualitative analysis methods, such as reflexive thematic

coding, allowed the author to derive meaningful patterns and themes from interviews, surveys, and self-reporting.

Ensuring transparency in the analysis process, having a systematic and well-documented analysis process enhances the credibility and dependability of the study.

DBR studies necessitate a reflexive stance on the part of the researcher. Reflecting on one's own biases, assumptions, and perspectives is crucial for maintaining the integrity of the study. The author endeavoured to be transparent about their role, position, and potential influence on the research process and outcomes at all times.

The author kept a reflexive journal throughout the study to document and acknowledge the dynamic relationship between researcher and participants, as well as the impact of contextual factors on the study. Transparent reporting of the research process enhanced the trustworthiness of the findings.

While DBR studies prioritise context-specific findings, there is still room for generalisation within the boundaries of the studied context. Rigorous DBR involves carefully defining the contextual factors that may influence the outcomes and considering how the findings might be applicable to similar educational settings.

The author has endeavoured to be explicit about the limitations and generalisability of their findings, acknowledging the contextual factors that may influence the transferability of the results to other settings (see Chapter 4 and 5 for more details). This nuanced approach to generalisation contributes to the rigour and validity of the study.

Maintaining rigour in a DBR study that focused on teachers' understanding and application of UDL required careful attention to the research design, collaboration with stakeholders, iterative cycles of improvement, multi-method data collection, ethical considerations, systematic data analysis, reflexivity, transparency, and a nuanced approach to generalisation. By upholding these principles, the author sought to ensure that their findings contribute meaningfully to the field of inclusive education and inform both educational theory and practice. The commitment to rigour in DBR enhances

the credibility and applicability of the research outcomes, ultimately benefiting teachers, students, and the broader educational community.

3.3 Data Collection Process and Instruments

The utilisation of reflexive thematic analysis highlights a deliberate and iterative process of data analysis, which supports the iterative nature of the project design wherein the author has engaged deeply with the data to identify recurring patterns, emerging trends, and significant narratives. A DBR study demands a more design thinking approach to data analysis. Braun and Clarke (2022) identify that reflexive thematic analysis has led some qualitative methodologists to argue that its use demands more conceptual and design thinking from researchers. By embracing reflexivity, the author critically examined their own assumptions, biases, and preconceptions, thereby enhancing the rigour and credibility of the analysis.

The triangulation of surveys, interviews, and participant implementation reports data offers a comprehensive exploration of the experiences, perspectives, and practices of the participants involved in the study. Surveys provided a broad overview of participants' demographics, attitudes, and self-reported behaviours, while interviews offered a deeper insight into the nuances of their experiences and perceptions. Participant implementation reports further enrich the analysis by offering firsthand accounts and contextualised narratives, thereby enriching the understanding of the phenomena under investigation. In June 2021 an information brochure (Appendix 3) was sent out to all teaching staff across Kerry ETB schools and FET Centres to establish if people were interested in volunteering to participate in the study.

The initial response to the call for interested participants in June 2021 resulted in a 66% engagement rate from primary schools, with two out of three schools identifying staff members to participate. There was full engagement from post-primary schools, as all eight schools identified staff to take part in the study and a 21% engagement rate from Further Education and Training (FET) Centres/Colleges. A general information meeting was held on October 5, 2021, via Microsoft Teams for all interested parties. The purpose of this meeting was to ensure that potential participants understood the study's objectives and

the time commitment required. Additionally, due to COVID-19 restrictions, this meeting provided an opportunity for potential participants to familiarise themselves with the online platforms that would be used in the study. The author and Kerry ETBs educational technology officer addressed all relevant questions from attendees. At the end of the meeting, participants were asked to take time to consider the study and the commitment it would entail. Those still interested were instructed to email the author to receive a consent form and project information leaflet. Upon receipt of the signed consent form, participants were enrolled as members of the UDL Champions Microsoft Teams site and given access to the resources OneNote notebook.

3.3.1 Data Sources and Timeline

To support the iterative nature of DBR, the author developed a flexible data collection process designed to capture participants' experiences throughout the study. Surveys were strategically linked and distributed at key stages to gather insights into participants' experiences. This approach was intended to facilitate the ongoing development of the cross-sectoral CoP and targeted PD, ensuring that participants' needs were effectively addressed. By continuously capturing participants' feedback, the process adhered to UDL principles, empowering participants to voice their opinions and make choices throughout the design process. This method was particularly important in an online CoP, as it accurately reflected participants' lived experiences. Maintaining the study's relevance, especially during the uncertainty of the COVID-19 years 2021-2023, required proactive support for participants. Effective community research demands constant communication and multiple contact points to gather accurate information (Widianingsih & Mertens, 2019).

3.3.2 Design Process

A mixed-methods design was employed in this study, characterised as QUAL +quan research. This approach is particularly suitable for exploring complex research questions that require both rich interpretive insights and empirical validation. QUAL +quan research is a form of mixed methods that primarily emphasises qualitative methods while integrating quantitative data and techniques to enrich the analysis (Johnson et al., 2007).

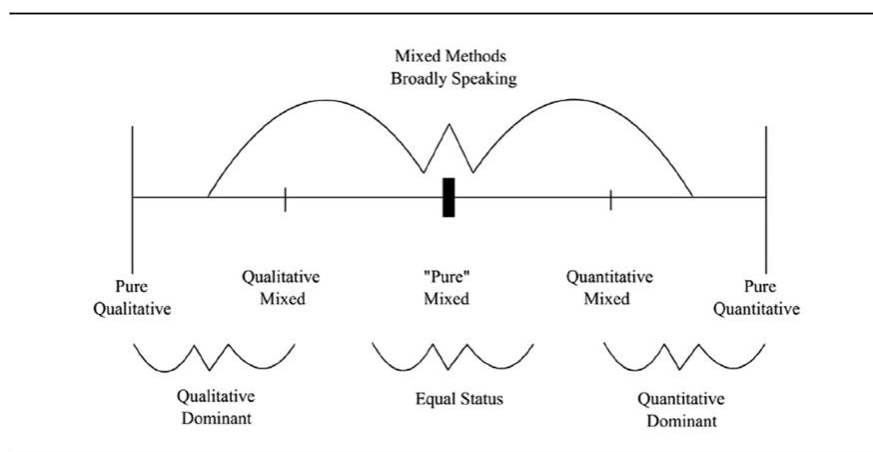


Figure 3-3 Research Paradigms, Including Subtypes of Mixed Methods Research Johnson et al., 2007

The QUAL +quan approach, as illustrated on the left side of the continuum in Figure 3-3, is especially appropriate for this study. This design allows for the integration of quantitative data into a predominantly qualitative study, aligning with the interpretivist/constructivist paradigm that underpins the study. This paradigm emphasises understanding participants' lived experiences and the meanings they construct within their social contexts. By combining qualitative and quantitative methods, the research benefits from a more comprehensive analysis that enhances both the depth and validity of the findings (Johnson et al., 2007; Tashakkori & Teddlie, 2010).

The choice of a QUAL +quan design is driven by the need to capture the nuanced realities of the participants while also situating these insights within broader empirical patterns. The qualitative component allows for an in-depth exploration of subjective experiences, while the quantitative data provides a means to contextualise and validate these interpretations (Heyvaert et al., 2013). This approach ensures a richer understanding of the research problem, addressing the intersection of individual experiences with broader social phenomena.

The iterative process of data collection and analysis inherent in the QUAL +quan framework facilitates continuous comparative analysis between qualitative and quantitative data. This methodological synergy allows for the identification of emergent themes that might be overlooked in a single-method approach and provides empirical validation for these themes (Tashakkori & Teddlie, 2010). Such an approach enhances the reliability and

validity of the findings, offering a more refined and comprehensive understanding of the research problem (Johnson al., 2007).

Furthermore, the integration of qualitative and quantitative methods is crucial for informing effective interventions and policy decisions. By combining detailed qualitative insights with empirical data, the study provides a holistic perspective that is essential for developing contextually relevant and empirically grounded recommendations (Roller & Lavrakas, 2015). This comprehensive approach ensures that the findings not only contribute to academic knowledge but also have practical implications for real-world applications.

The data collection was broken down into two distinct categories:

1. Data collected to measure the impact of the CoP and targeted PD to answer research question one and two and
2. The experience of participants implementing UDL within their educational settings to answer research question three.

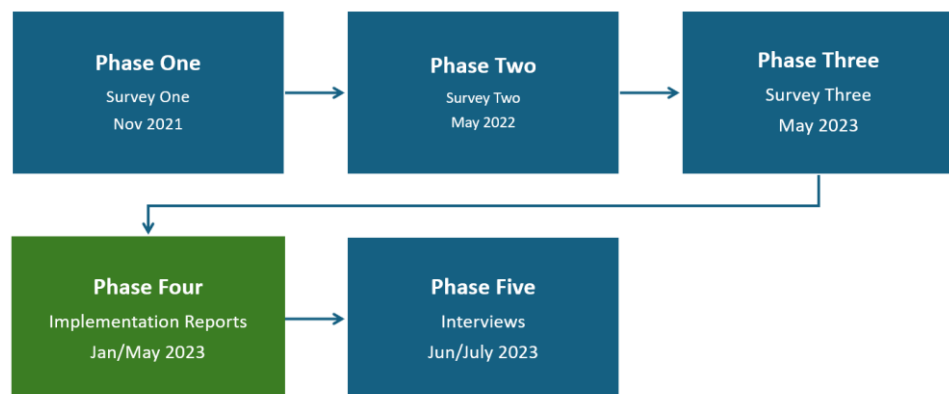


Figure 3-4 Iterative data collection process

Capturing data throughout the study allowed for a more nuanced and accurate measurement of the study's interventions.

This QUAL +quan study employed both qualitative and quantitative analyses, utilising each method separately and in tandem. Qualitative data was subjected to thematic analysis, identifying patterns, themes, and holistic features across the dataset (Braun & Clarke, 2006). This approach enabled the appreciation of variations and differences among participants, enriching the overall analysis. Descriptive statistical techniques were used to analyse

quantitative data, providing a clear, objective overview of participant characteristics, understandings and beliefs.

By connecting theory and practice, this study bridges the gap between academic research and practical application in educational settings. It acknowledges the complexity of causation, addressing both nomothetic causation, which identifies general patterns, and idiographic causation, which focuses on individual experiences (Yin, 2018). This dual focus allowed the study to integrate national and international policy considerations with local contextual factors, ensuring the relevance and applicability of the findings. The multi-lens approach, incorporating both “subjective insider” and “objective outsider” perspectives, enhanced the depth and validity of the analysis (Denzin & Lincoln, 2011). This comprehensive perspective is essential for designing interventions that are both contextually grounded and theoretically informed.

The QUAL +quan mixed-methods approach facilitated the study of multiple contexts, perspectives, and conditions, crucial for understanding the complex, interrelated factors influencing teacher agency in this cross-sectoral study (Greene et al., 1989).

By examining the group and individuals in a natural setting, the research aimed to capture insiders' views, meanings, and perspectives, providing a rich, contextualised understanding of the interventions under investigation (Maxwell, 2012).

3.3.3 Data Collection Instruments

The QUAL +quan research design employed multiple data collection methods to provide a comprehensive examination of the phenomenon under investigation. According to Teddie and Tashakkori (2010, p. 8), a mixed-methods approach integrates a diverse array of techniques from both qualitative and quantitative research to more thoroughly investigate a given phenomenon. This study utilised a mixed methods approach to incorporate various methods for exploring different perspectives and multiple facets of the interventions (Mertens, 2019).

The data collection instruments for both phases of this research are detailed in the subsequent sections. Qualitative data was obtained through iterative surveys, interviews, participant self-reports, and reflexive journals (Appendix 14). In contrast, quantitative data was collected exclusively via surveys. This approach allowed for a robust investigation by leveraging both qualitative and quantitative data to capture a more nuanced and comprehensive understanding of the research topic.

Data Source	Number of Participant Responses	Date
Survey 1	29	Nov 2021
Survey 2	26	May 2022
Survey 3	16	May 2023
Self-Implementation Reports	16	Jan/May 2023
Interviews	7	Jun/July 2023

Table 5 Data Collection Schedule

3.3.3.1 Survey Design

The iterative nature of data collection necessitated a well-structured design thinking process to ensure the surveys were reflexive and dynamic. This approach was intended to encourage participants to reflect on their responses in the context of the project's evolving interventions, rather than perceiving the surveys as mere data collection tools. It was crucial that the surveys aligned with the DBR methodological framework, offering ongoing insights that could guide the study's progression, rather than serving solely as a mechanism for reporting findings at its conclusion. The iterative surveys were analysed both individually and collectively. Individual analyses provided snapshots of the intervention's development, allowing for iterative adjustments in accordance with the DBR methodology. These insights were instrumental in refining the intervention design. At the study's conclusion, the surveys were analysed collectively to develop codes and themes that contributed to the empirical findings.

All three surveys were divided into sections with recurring themes to support continuous analysis.

Question Themes	Survey One	Survey Two	Survey Three
Participants Information	X	X	X
The role of Technology in your teaching	X		
Participation in the UDL Champions Project	X	X	X
UDL/Planning/Implementation/Individual and School Planning	X	X	X
Reflections	X	X	X

Table 6 Survey Themes and Sections

Both qualitative and quantitative survey data was collected using Microsoft Forms, a structured and validated instrument, ensuring precise measurement and reliability (Appendix 4). Microsoft Forms was also chosen for this study to meet standards of accessibility and flexible access, aligning with the principles of UDL. The platform's built-in assistive technologies allowed for questions to be read aloud and translated into multiple languages, enhancing accessibility for diverse participants (Rose & Meyer, 2002). Descriptive analysis of this data was conducted using Microsoft Excel's descriptive analysis tools. Microsoft Forms automatically generates an Excel spreadsheet from the collected data, providing an objective overview of participant characteristics.

Surveys 1-3 contained five types of Qualitative question see examples below:

Question type	Question	Answer Format
Descriptive questions	What does inclusive practice mean to you?	Long Text
	What support structures are available within your school	Long Text

	to assist you in the implementation of inclusive practice?	
Exploratory questions	Did you find participating in the project this year worthwhile? Which aspect(s) of the project so far have you found most effective?	Yes/No branched Long text
Experiential questions	What resources and supports do you need to develop UDL implementation in your school/centre? What recommendations would you make on developing a whole school/centre approach to UDL?	Long text Long text
Process-oriented questions	How does your school/centre plan to embed UDL in teaching and learning? Have you provided training to other staff members in your workplace? Please give details of this training?	Long Text Yes/No branched Long text
Theoretical questions	What have been your key takeaways for the first year of the UDL Champions Project? Is there anything that you would change or add to our	Long text Long text

	UDL champions group sessions for next year? What are your expectations for year two of the project?	Long text
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Table 7 Surveys 1-3 Types of Qualitative Question

Surveys 1-3 also contained three types of Quantitative question see examples below:

Question type	Question	Answer Format
Descriptive Questions	How many years have you been teaching?	Selection from a predefined list
	Do you hold any of the following qualifications in Education?	Selection from a predefined list
	Do you hold any of the following qualifications in Special Education?	Selection from a predefined list
Comparative Questions	How beneficial did you find participating in the UDL Champions project?	Ranking
	Which aspect of this project did you find most beneficial?	5-point Likert Scale
Relationship Questions	At the end of this project how would you rank your understanding of inclusive practice?	Ranking
	At the end of this project how would you rank your understanding of UDL?	Ranking

Table 8 Surveys 1-3 Types of Quantitative Question

As part of the design process, the author had the opportunity to consult online with Professor Emeritus Donna Mertens from Gallaudet University, Washington, D.C., to discuss mixed methods research approaches. Drawing on Mertens' guidelines for conducting survey pilots, as detailed in the literature

(Mertens, 2019, p. 204). The following steps were implemented in the pilot phase:

- Select a pilot sample similar to your target population.
- Format the survey to allow room for comments to be provided.
- Inform the participants that you are interested in their reactions to the process and questions and encourage them to note any ambiguities or response options that are not included.
- Follow the procedures for administration that you plan to use for your study; and
- Once the data is collected read the comments, check the responses item by item, do a brief analysis, and add, change, or delete any questions as needed.

The author engaged three participants in the piloting process 1. Kerry ETBs educational technology officer, 2. A teacher with over 20 years of experience in mainstream and special education support and 3. A critical friend in Higher Education.

The surveys were developed using Microsoft Forms, with two distinct links created: one for respondents and one for editing. The respondents' link enabled pilot participants to test the survey's structure, branching, and mechanics. The editable link allowed pilot participants to provide real-time feedback on question design and survey structure. The author engaged with each member of the pilot group to discuss suggested changes, updated the surveys accordingly, and then redistributed the links for final confirmation before administering the surveys to the study participants.

3.3.3.2 Administering the Survey

Before each survey was distributed to participants, an informational session was conducted during a weekly CoP meeting. This session provided detailed instructions on how to access and complete the survey and addressed any questions regarding the survey process. Privacy and confidentiality of participants were significant ethical concerns for the author in this study. To address these concerns, each participant was assigned a unique identification code at the outset, known only to the author and the individual. All data was stored under these codes, in accordance with TCD's storage and retention policy.

Participants Codes	Data Types Codes
Primary School UDLCP-1-01 - UDLCP-1-02 Post Primary UDLCP-2-01 -UDLCP-2-17 FET UDLCP-3-01 - UDLCP-3-11	Surveys (S1) (S2) (S3) Interviews (I) Reports (R)

Table 9 Participants Unique Identifier Codes and Data Types Codes

Participants were each sent an email with their unique identifier code, along with information and instructions, for each survey (Appendix 5). Reminder emails were dispatched two weeks after the initial distribution of all surveys. Following the completion of the third survey, all participants were invited to volunteer for an interview with the author. Seven participants agreed to this request, and a schedule for the interviews was established, with interviews occurring between June 28, 2023, and July 31, 2023.

3.3.3.3 Interviews

In this study, a structured interview approach was selected as part of a mixed methods design to ensure consistency and depth in data collection. Interviews are a fundamental component of qualitative research, as emphasised by Brenner (2006), who identifies them as a cornerstone of qualitative inquiry. Mertens (2019) supports this view by highlighting that interviews enable a comprehensive understanding of participants' experiences, offering a full range and depth of information.

This author considered three types of interview structures: structured, semi-structured, and unstructured. The decision to utilise a structured interview format was guided by several key considerations. Edwards and Holland (2013) describe structured interviews as providing a fixed set of questions that ensure consistency across interviews, which enhances comparability and clarity. Given the study's two-year duration and the established rapport between the author and participants, a structured approach was deemed by the author to be suitable for capturing detailed and consistent responses while minimising potential biases. This method aligns with Creswell's (2012) assertion that the researcher serves as the primary instrument of data

collection, ensuring that participants' narratives are both rich and standardised.

The choice of a structured interview format was further supported by the recommendations of Stuckey (2013) and the findings of DiCicco-Bloom and Crabtree (2006), who argue that structured interviews are particularly effective for maintaining data reliability and validity in research contexts where consistency is critical. By employing this approach, the study endeavoured to adhere to best practices in qualitative research and to maintain methodological rigour.

To ensure the reliability of the interview questions, the same piloting process was used as for the surveys. A set of six detailed questions was developed and subjected to pilot testing to evaluate their clarity and effectiveness. Feedback from this pilot phase was used to refine the questions, ensuring they elicited comprehensive and relevant responses. Interviewees were provided with the questions one week before their scheduled interviews, allowing them sufficient time to reflect on their answers. This preparation aimed to improve the quality of responses and ensure that the interview instrument was accurately aligned with the study's objectives.

Interview questions:

1. Can you compare and contrast your experience with the design of this project with previous continuous professional development courses or training programs you have participated in? What were the key differences you observed, and how did these differences contribute to the success of the project?
2. How did participating in the Universal Design for Learning (UDL) Implementation community of practice impact your teaching practice? Did it lead to any significant changes in your instructional strategies, assessment methods, or classroom environment? Please provide specific examples.
3. In what ways did the design of the project foster a sense of community and collaboration within the Universal Design for Learning Implementation community of practice? How did this collaborative

environment contribute to your professional growth and the exchange of ideas among participants?

4. Reflecting on your experience, what specific improvements or advancements did you notice in your practice as a result of participating in the project and engaging with the UDL Implementation community of practice? How did these improvements translate into enhanced learning experiences for your students?
5. How did the design of the project address the diverse needs and backgrounds of the participants in the Universal Design for Learning Implementation community of practice? Were there any specific strategies or resources that were particularly effective in promoting inclusivity and ensuring equitable access to learning opportunities?
6. Looking ahead, how do you envision the long-term impact of participating in this project and being a part of the Universal Design for Learning Implementation community of practice on your professional development? Do you anticipate incorporating UDL principles into your future teaching practice, and if so, how do you believe it will positively impact your students' learning outcomes?

Structured interviews are governed by specific guidelines that the researcher must follow (Stuckey, 2013). This includes strict adherence to the sequence and wording of questions throughout the process. In this study, interviews were conducted via Microsoft Teams with live transcription enabled. The auto-transcription feature served as an intermediary between the author and the interviewee, ensuring that all verbal exchanges were accurately captured and transcribed into text. This approach mitigated potential interpretive biases and facilitated precise and comprehensive documentation of the dialogues (Janesick, 2015).

Dörnyei (2007) highlights two essential characteristics of a successful qualitative interview: "(a) it flows naturally, and (b) it is rich in detail" (p. 140). To achieve these outcomes, researchers must prioritise listening over speaking during the interview, refraining from expressing agreement, disagreement, or suggesting answers (Stuckey, 2013). During the interviews, the researcher turned off their camera to minimise the influence of facial expressions or body language on the interviewees. This structured approach allowed interviewees

to thoughtfully reflect on and articulate their responses, contributing to a body of knowledge that is both conceptual and theoretical, grounded in the meanings participants ascribe to their experiences within the study.

3.3.3.4 Participants Implementation Reports

A significant gap identified in the literature concerns the efficacy of measuring classroom UDL interventions (Edyburn, 2010). To address this issue, the author adapted the UDL_IRN reporting criteria (Appendix 6) to improve the precision and consistency of participants self-reporting, thereby enhancing the replicability of processes and findings. The criteria encompassed key components such as Student Information, Purpose, Outcomes, Limitations, and Implications for Practice, creating a structured and analytical framework for effective reporting.

During the CoP meetings, the UDL_IRN reporting criteria was discussed and critically evaluated with participants. Comprehensive instructions were provided to ensure participants could complete their reports accurately and effectively.

3.3.3.5 Sample size

The year one sample size was (n=29)

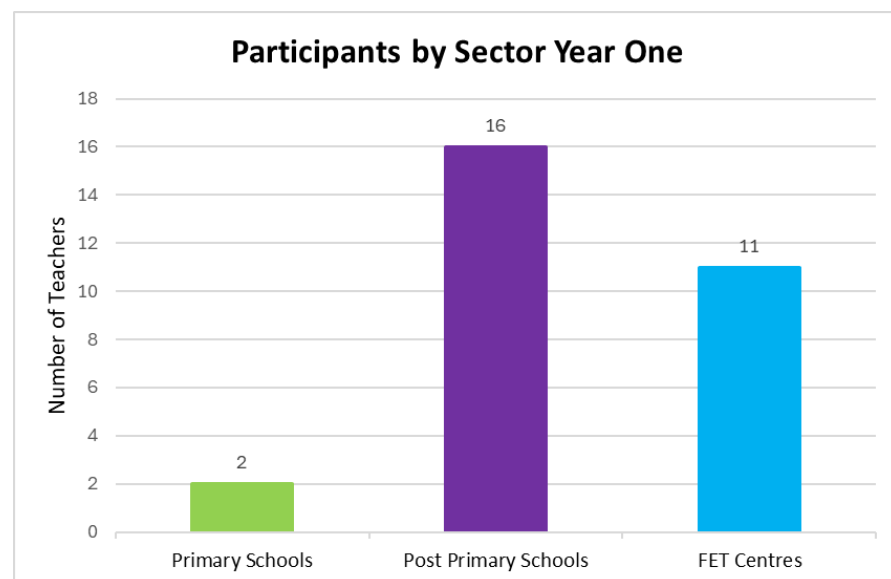


Figure 3-4 Sample size Year One

The study sample Year one was (n=29) which consisted of:

- 7% (n=29) Primary Educators
- 55% (n=29) Post Primary Teachers
- 38% (n=29) FET teachers

There was a 20.69% attrition rate between year one and year two. At the end of year two there were (n=23) participants in the study 6 people had to drop out due to workload but all expressed a positive mindset towards the study and expressed regret at having to leave. This dropout level did affect the number of primary schools participating, reducing it from 2 to 1. All other numbers in relation to sectoral representation remained the same as the study design called initially for at least two participants from each school or centre.

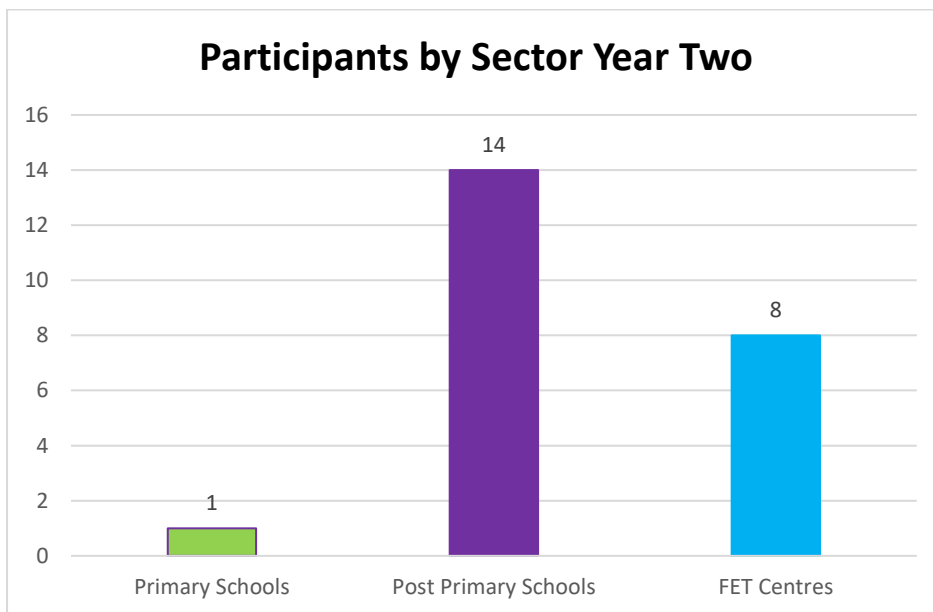


Figure 3-5 Sample size Year Two

The sample for this study Year Two was (n=23) which consisted of:

- 4% (n=23) Primary Educators
- 61% (n=23) Post Primary Teachers
- 35% (n=23) FET teachers

The number of implementations completed was (n = 16). Although the project design initially required two participants per school or centre, this approach proved impractical for some institutions. Consequently, this discrepancy influenced the relationship between the number of participants and the

number of completed implementations. Additionally, one post-primary school opted to conduct two separate implementations, further affecting the overall count. Which resulted in:

- 1 Primary School Implementation Report
- 9 Post Primary Implementation Reports
- 6 FET Centre Implementation Reports

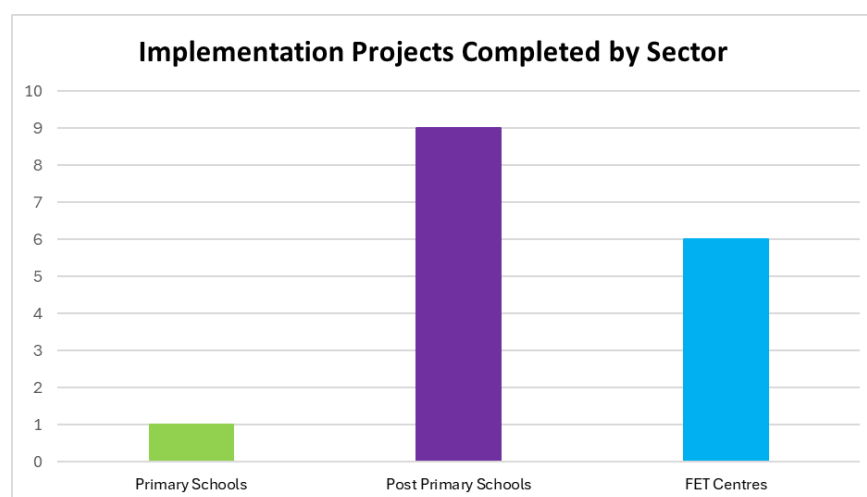


Figure 3-6 Number of UDL Implementation Reports Completed by Sector

3.3.3.6 The Participants' Profiles.

This section provides an overview of the participant profiles in the sample by examining their level of teacher experience, their participation in specialist training (special education) and their subject.

The participants' experience profiles in this study aligned with findings from Banks and Smyth, (2011) who found that the take-up of CPD appears to increase throughout the teaching career, with those working over 20 years or more having the highest take-up. In this study 58.6% (n=29) of the participants had 15 + years of teaching experience.

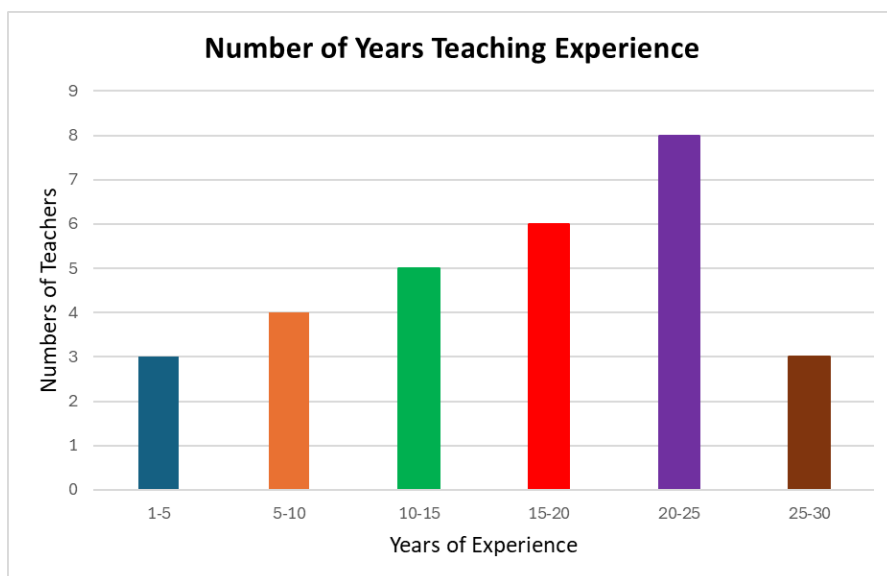


Figure 3-7 Participants Number of Years Teaching Experience

A total of 24% (n=29) participants who volunteered for this study had additional special education training, of those the highest portion was in the FET sector with 42.8% (n=29).

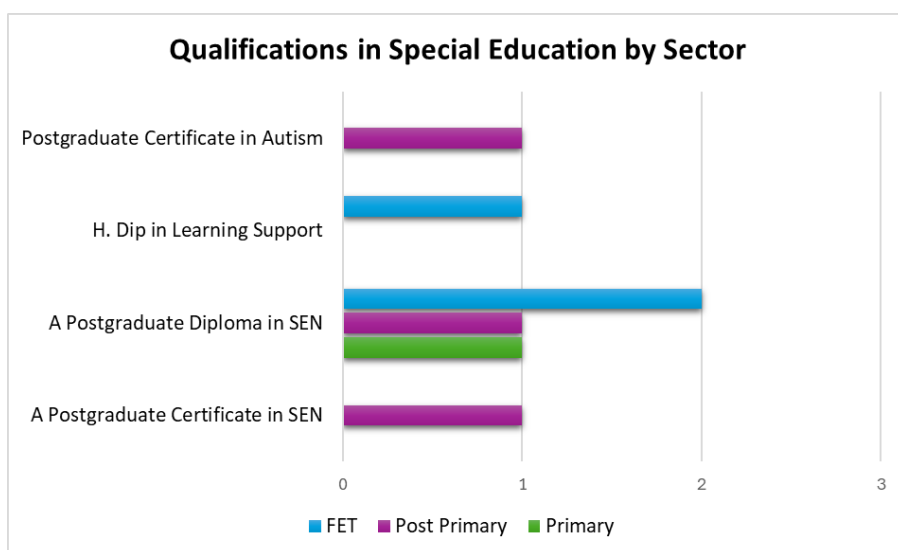


Figure 3-8 Number of Participants with Special Education Qualifications by Sector

The participants who volunteered for the study taught across a vast range of subjects in all sectors which indicates that they saw inclusion as part of all subject educator's remit.

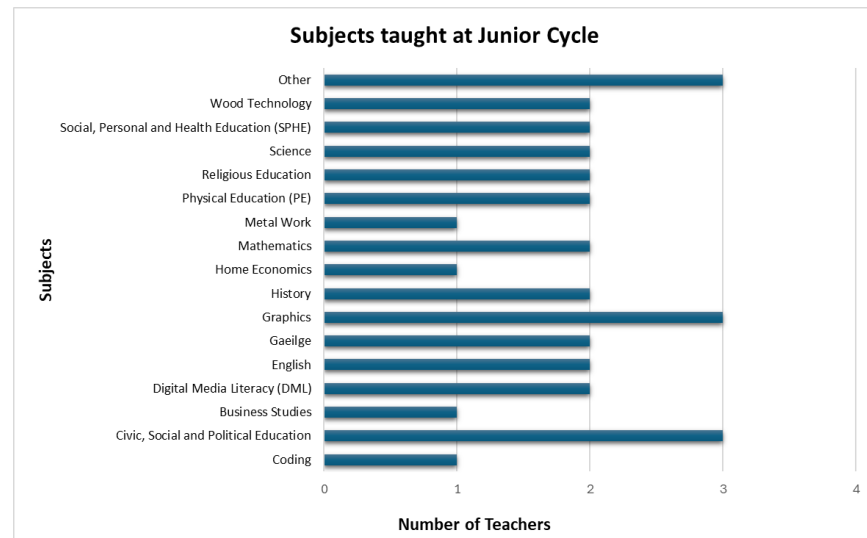


Figure 3-9 Subjects taught at Junior Cycle

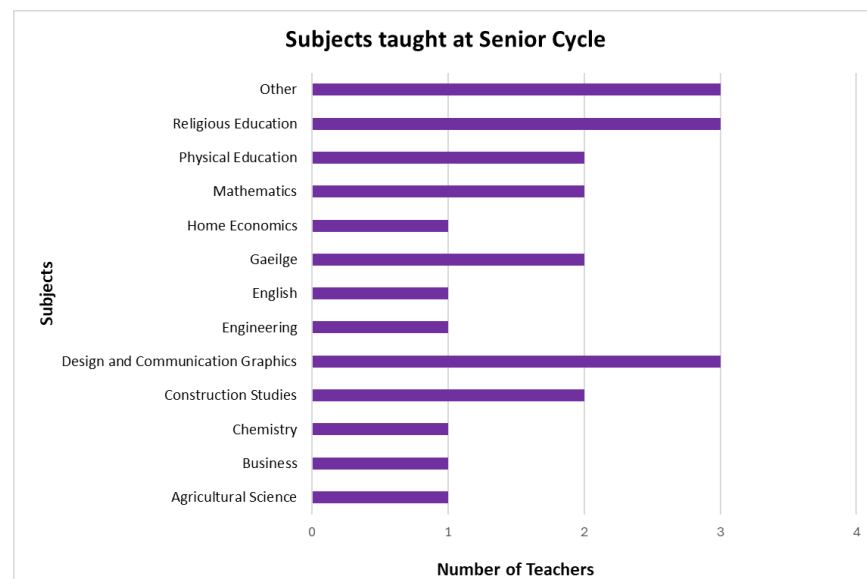


Figure 3-10 Subjects taught at Senior Cycle

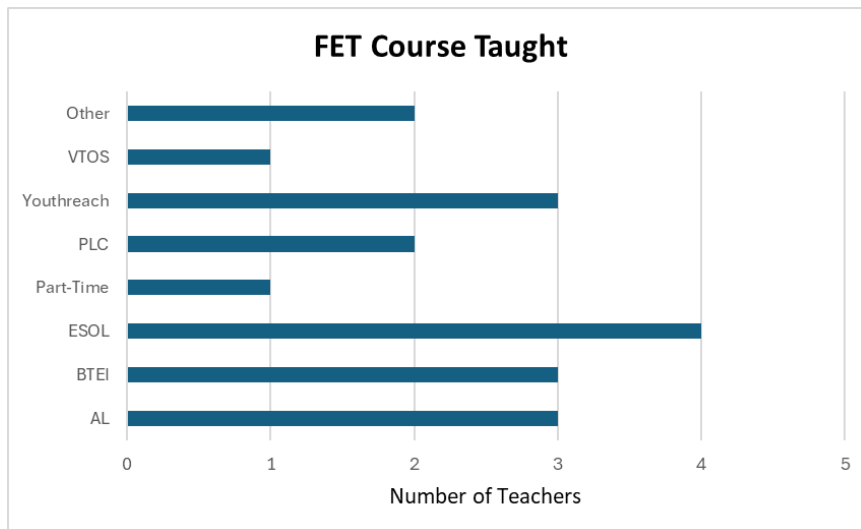


Figure 3-11 Types of FET Course Taught

Evidence of commitment and interest in UDL implementation in schools was reflected in 62% (n=29) of volunteers coming from Primary and Post Primary. UDL practice is supported nationally in tertiary education through the National Forum UDL digital badge which has been a huge success with c.4000 practitioners having completed at the time of writing. FET also have their own UDL for FET Practitioners Guidelines (Heelan & Tobin, 2021). At the time of writing there isn't any equivalent department of education provided UDL training or support available to schools.

3.4 Data Analysis

In this DBR study, the choice of analytical method was pivotal in uncovering the nuances and complexities inherent in the participants experiences. In this context, the utilisation of Braun & Clarke's (2019) reflexive thematic analysis (RTA) served as a robust analytical tool. This approach allowed for a systematic exploration of the qualitative data, facilitating the identification of patterns, themes, and implicit meanings within the narratives of the participants.

The reflexive nature of thematic analysis aligns well with the iterative and reflexive nature of design-based research. DBR emphasises an ongoing cycle of design, implementation, and evaluation, requiring researchers to continuously reflect on their own assumptions and practices. Braun and Clarke's approach acknowledges this reflexivity, allowing the author to engage in a dynamic

process of sense-making, where interpretations were constantly revisited and refined in light of new data and insights.

Moreover, thematic analysis provided a flexible yet rigorous framework for analysing the vast amount of qualitative data within the surveys, interviews and participants implementation reports. In a study that was focused on teachers' experiences with UDL implementation, flexibility was crucial due to the multifaceted nature of classroom practice. Teachers' experiences are inherently complex, influenced by a myriad of contextual factors such as student diversity, institutional policies, and pedagogical beliefs. Thematic analysis allowed the author to capture this complexity by identifying semantic themes the author was able to encapsulate the diverse range of experiences and perspectives explicitly expressed by participants.

Semantic and latent themes enabled the author to systematically identify and summarise the key ideas, experiences, and challenges reported by the participants. By focusing on what was explicitly said by participants, semantic and latent themes provided a comprehensive overview of the data, allowing the author to distil the richness of the participants experiences into meaningful themes and subthemes.

By employing a reflexive thematic analysis approach in the study of teachers' experiences within a cross sectoral UDL community of practice, the author strived to demonstrate a commitment to honouring the diversity of voices and experiences within the educational community.

The author applied Braun & Clarke (2006) six-phase framework to the data analysis in the following way:

Phases of Analysis	Description	Actions
Familiarisation with Data	The author began by immersing themselves in the data to understand depth and breadth of the content. Searching for patterns and meaning.	Reading and re-reading the surveys, and the participant implementation reports. Transcribing interviews. Note taking
Generating Initial Codes	The author used a systematic line by line coding method giving	Codes were used to summarise or describe a particular piece of data.

	full and equal attention to each data item.	Initially, these codes were quite specific, capturing individual concepts, phrases, or ideas present in the data.
Searching for Themes	Following on from the set of initial codes, the author began to search for patterns or connections among them.	The author further identified similarities, differences, and recurring concepts across the different codes. The author then grouped related codes together to form potential themes.
Reviewing Themes	Once the potential themes were identified, the author reviewed and further refined them.	This involved going back to the data to ensure that each theme accurately captured the content and context of the coded data. The author endeavoured to identify themes that were coherent, meaningful, and relevant to the research questions.
Defining and Naming Themes	The author clearly defined each theme in terms of its content and scope. Identifying what the theme encompassed and what were its key characteristics.	Each theme was given a clear and descriptive name that accurately reflects its content. Within each of the three main themes, sub-themes were identified to ensure that there was an appropriate level of detail in each theme. To ensure the validity of the interpretation of the data. The author sought to ensure that the themes are understandable and meaningful to others who may be reading or using the analysis and that they are a true

		representation of the participants thoughts, opinions and beliefs
Producing the Report	The author strives in the findings chapter to present the themes, along with supporting evidence from the data, in a clear and organised manner.	Providing interpretations and insights based on the identified themes, to answer the research questions. Throughout this process, it was important for the author to maintain reflexivity, reflecting on their own biases, assumptions, and perspectives to ensure they didn't influence the analysis.

Table 10 Clarke and Braun Six-phase of Data Analysis

3.4.1 Reflexive Thematic Analysis (RTA)

Braun and Clarke (2022) state that there are many routes into design for reflexive thematic analysis, but that flexibility and accessibility make it a useful method for community research designs, where participants are co-researchers and contribute to data analysis. As DBR researchers take an interventionist approach and work closely with educators to understand complex problems of practice, and on the collaborative design, development, implementation, and evaluation of research-informed innovations in authentic learning contexts. It is reasonable to assert that the chosen analysis method positions the qualitative researcher as a key instrument in the research process. As Maguire and Delahunt (2017) suggest, the researcher's ability to comprehend, describe, and interpret experiences and perceptions is crucial for uncovering meaning within specific contexts. Therefore, data analysis plays a central role in ensuring the credibility of qualitative research. Vaismoradi et al. (2013) suggest that data gathering, and analysis is conducted concurrently in a descriptive qualitative approach, thus adding to the depth and quality of data analysis. This approach also fits with DBR and the UDL framework, multimodal methods for data gathering were employed in this research study and involved author and participant generated data. Using multiple methods

of data generation and data sources enabled the author to explore the different levels and perspectives and understanding of individual educators across the three sectors. In fact, Markle et al., (2011) suggest that the developments in technology now offer us unique opportunities to collect, analyse and embed actual multimedia data, which would avoid loss of meaning and unavoidable interpretation bias inherent in transcription. Working with data in original multimedia state instead of transcription can allow for greater trustworthiness and accuracy as well as richer descriptions and more informative reporting. This would also support a UDL approach allowing both the participants and author to access and analyse data in more meaningful ways.

Data was deliberately gathered at key intervals throughout the study as discussed above in section 3.3.3 to ensure that the findings could inform the development of the research design and to encourage the participants to take ownership of the design and development of their UDL implementations. This study started with an opening survey to establish a baseline of understanding of the participants needs in relation to inclusive practice and technology enhanced learning. It was this provisional understanding that prompted the author to choose reflexive thematic analysis as the data analysis tool for this study. Reflexive thematic analysis is described as a suitable method for examining the perspectives and practices of different research participants, for example by facilitating the highlighting of similarities and differences Braun and Clarke, (2006) this was especially important in the study as participant where from three different sectors of the Irish education system. It also allowed the author to refine the research questions and better align the methods of data gathering. For example, establishing baselines for understanding of inclusive practice, UDL and technology skills. Supported the design and development of the training and CoP in year one. Also, as a result of this analysis the author included a reflexive journal space for the participants within the online space.

Braun and Clarke (2019) do not prescribe a theoretical approach to analysis instead they offer three possible approaches inductive/deductive, semantic/latent, and critical realist/constructionist.

Inductive/Deductive Approaches

- **Inductive analysis:** A bottom-up approach where patterns and themes are derived from the data to develop broader theories or explanations.
- **Deductive analysis:** A top-down approach where existing theories or hypotheses are tested against the data to confirm or refute them.

Semantic/Latent Approaches

- **Semantic analysis:** Focuses on the explicit and surface-level meaning of text or data, often involving content analysis or keyword searches.
- **Latent analysis:** Delves into the underlying or implicit meanings, structures, and patterns within the data, often using interpretive or qualitative methods.

Critical Realist/Constructionist Approaches

- **Critical realist analysis:** Seeks to uncover underlying structures and causal mechanisms that shape observable phenomena, while acknowledging the limitations of empirical data.

Constructionist analysis:

- Examines how social realities are created and maintained through language, discourse, and social interactions, emphasising the role of power and context.

However, they propose that employing a constructionist, latent, or theoretical approach to thematic analysis (TA) may be more feasible with qualitative survey data. This is because such approaches extend beyond the explicit content of the data to explore the underlying meanings and logical structures. By focusing on the deeper significance and theoretical issues behind the responses, researchers can move beyond the constraints imposed by the survey's questions and responses.

For the purpose of this research the author has employed a critical realist/constructionist approach as the proposed outcome of this study is to produce a UDL implementation roadmap for the Irish education system which could be adopted and applied to future education policy. Critical realist research methods are primarily focused on understanding, rather than merely

describing, social reality. To this end, critical realist research is ecumenical in its approach to research, fitting designs and methods to the problem in hand (Vincent & O'Mahoney, 2018).

Braun and Clarke (2006) suggest that it is the first qualitative method that should be learnt as 'it provides core skills that will be useful for conducting many other kinds of analysis' (p.78).

A further advantage, particularly from the perspective of learning and teaching, is that it is a method rather than a methodology (Braun & Clarke 2006; Clarke & Braun, 2013). This means that, unlike many qualitative methodologies, it is not tied to a particular epistemological or theoretical perspective. This makes it a very flexible method, a considerable advantage given the diversity of work in learning and teaching. (Maguire & Delahunt, 2017).

3.4.2 Reflexive Thematic Analysis in Design-Based Research

DBR is a cyclical approach to inquiry that integrates the development and iterative testing of innovative interventions within the context of real-world settings. Its goal is to generate knowledge that is both theoretically grounded and practically applicable, fostering a continuous cycle of design, enactment, analysis, and adaptation.

Reflexive thematic analysis (RTA) is a qualitative data analysis method that complements DBR's cyclical nature by enabling researchers to identify, analyse, and interpret patterns within the vast amounts of data generated throughout the design and implementation phases of a DBR study. RTA's emphasis on reflexivity, or the researcher's conscious awareness and consideration of their own biases and assumptions, aligns well with DBR's emphasis on practitioner involvement and the co-creation of knowledge.

3.4.2.1 Benefits of RTA in DBR

RTA's methodological rigour and commitment to reflexivity underpin the academic integrity of this DBR study. The author ensured that their RTA approach remained both rigorous and transparent by adhering to the following practices:

Thematic Identification and Analysis: RTA facilitated the identification of recurring themes, patterns, and connections within the qualitative data, enabling the author to gain a deeper understanding of the experiences, perceptions of the participants, and the outcomes associated with the design interventions.

Context-Sensitive Interpretation: The emphasis on contextual understanding within RTAs enabled the author to interpret data specific to the cross-sectoral setting, recognising the unique circumstances of individual participants. Additionally, the constraints imposed by Covid-19 restrictions were considered, enhancing the relevance and practical application of the findings.

Multiple Perspectives: RTA supported the collection and analysis of data from multiple sources, such as surveys, self-reporting, observations, and interviews, providing a comprehensive and nuanced understanding of the research phenomenon.

Flexibility and Adaptability: RTA's flexible structure allow the author to tailor the analysis process to the specific research questions and data characteristics, ensuring a fit with the dynamic nature of DBR.

Reflexive Epistemology: RTA's emphasis on reflexivity aligns with DBR's practitioner-engaged approach, which encouraged the author to acknowledge and address their own biases and assumptions, enhancing the credibility and trustworthiness of the findings.

3.4.2.2 Ensuring Academic Integrity with RTA

RTA's methodological rigour and commitment to reflexivity contribute to the academic integrity of this DBR study. By adhering to the following practices, the author endeavoured to ensure that their RTA approach was both rigorous and transparent:

Thorough Data Familiarisation: the author spent considerable time immersing herself in the data, reading and re-reading transcripts, observation notes, and other materials to gain a deep understanding of the content.

Clearly Defined Research Questions: the author created well-defined research questions that guided the thematic analysis process, ensuring that the analysis was focused and relevant to the research goals.

Transparent Coding Process: the author clearly documented their coding decisions, explaining the rationale behind assigning codes to specific data segments. This transparency allows for peer review and evaluation of the analysis process.

Thematic Development and Review: the author iteratively developed themes, refining and consolidating them as the analysis progressed. This process involved regular review to ensure consistency and consensus.

Contextualisation and Discussion: the author endeavoured to contextualise their findings within the broader theoretical and empirical literature, providing a framework for understanding and interpreting the themes.

Limitations and Reflexivity: the author acknowledged the limitations of their study, including potential biases, data limitations, and the impact of their own role in the research process.

RTA is a valuable tool for design-based researchers seeking to extract meaningful insights from their data. Its emphasis on thematic identification, context-sensitive interpretation, multiple perspectives, flexibility, and reflexivity aligns well with DBR's iterative and practitioner-engaged approach. By adhering to rigorous methodological practices and maintaining transparency throughout the analysis process, the author endeavoured to ensure the academic integrity of their DBR study and to the intention of contributing to the advancement of knowledge in the fields of inclusive practice and UDL implementation.

3.4.3 The Coding Process Employed in the Study.

In the field of qualitative research, thematic analysis stands as a powerful tool for uncovering patterns and themes within a rich tapestry of data. Among the various thematic analysis approaches, reflexive thematic analysis (RTA) stands out for its emphasis on researcher reflexivity and the iterative nature of the analytical process. At the heart of RTA lies the coding process, a crucial step

that involves systematically identifying, labelling, and categorising meaningful segments of data.

The coding process in RTA is not merely a mechanical task; it is an active engagement with the data that allows the researcher to delve into the depths of meaning, uncover hidden connections, and construct coherent themes. This process was shaped by the authors reflexive stance, prompting continuous self-awareness and consideration of their own biases, assumptions, and experiences as they interacted with the data.

3.4.3.1 Grasping the Nuances of Meaning: Generating Initial Codes

The coding process in RTA typically begins with an immersion in the data through repeated readings and transcriptions across all data sources. This initial phase allowed the author to gain a deep understanding of the context, content, and language of the data. As the author engaged with the data, they identify segments that conveyed important information or insights related to the research question.

These initial segments of data became the basis for generating initial codes. Codes are concise labels that capture the essence of the segment, representing key concepts, themes, or ideas. They served as the building blocks for organising and structuring the data, facilitating the identification of patterns and connections across the entire dataset. Having read the data response twice the author drew up a set of framing lenses to help identify initial codes (Appendix 7).

3.4.3.2 The Journey of Transformation: Moving from Initial Codes to Themes

Once the initial codes were established, the author embarked on a journey of transformation, creating a code book (Appendix 8) to weave together these individual codes to form broader themes.

Understanding of UDL: 47. What to you hope to gain from participating in this research project?	
10	Enhancing Teaching Practice: This theme looks at improved teaching methods and awareness of barriers, utilising technology and ICT for inclusivity. Code: [Teaching Style Adaptation]
10	Understanding and Implementing UDL: This Theme looks at gaining a better understanding of UDL, advocating for inclusion through UDL and Access to resources and strategies for UDL. Code: [Implementation of UDL]
12	Professional Growth: This Theme looks at enhancing confidence in applying knowledge, leading UDL practices within the school and enhancing confidence in applying knowledge. Code: [Continuous Learning]
8	Supporting Students: This Theme looks at ensuring all students' needs are met, promoting engagement and motivation and utilising available resources. Code: [Learner Needs]
4	Inclusivity and Accessibility: This theme revolves around the idea that every learner should have equal access to course content. Code: [Inclusivity]
1	Empowerment and Confidence: This Theme looks at being a better teacher and gaining confidence. Code: [Personal Confidence]
1	Barriers to Teaching: This theme highlights the demand of the current curriculum design and its impact on the ability of teachers to support all students. Code: [constrains]
	1. Learn how to implement the principles of UDL into my teaching practice.
	2. be able to be more interactive online with learners
	3. improved teaching methods and a better understanding of the barriers that we often overlook or are not even aware of
	4. As much as possible! to be better at what I do and create lively & stimulating learning environments for the students, to build a community of practice, to be an actor for what needs to be changed at curriculum level
	5. I hope to improve my teaching and teach staff to use UDL in their practice. I want to incorporate more TEL in my classes so that my learners fully understand and excel in their work.
	6. I would hope to get a better understanding of exactly what UDL means and contribute to its development along with the others in the group.
	7. I would love to learn new teaching techniques. I would love to be the best possible teacher I can with the hope that learners have a better experience to their education
	8. To provide better supports to students and teachers across all subject areas

Figure 3-12 Sample of Initial Codes from Survey One

This process entailed examining relationships between codes, identifying recurring patterns, and identifying underlying concepts that unify multiple codes.

Thematisation is not a linear process; it involves constant refinement and revision as the author grappled with the complexities of the data. The author merged codes that shared similar meanings, discarded codes that proved irrelevant, and created new codes to capture emergent themes (Appendix 9 & 11).

3.4.3.3 The Essence of Reflexivity: Bringing the Researcher into Focus

The essence of reflexive thematic analysis lies in the researcher's active engagement with the data. Their own experiences, perspectives, and biases inherently influence the coding process, shaping the interpretation of the data. Therefore, reflexivity is not an afterthought but an integral part of the analytical journey.

Throughout the coding process, the author continuously reflected on their own role in the analysis, acknowledging how their own background, assumptions, and experiences may shape their interpretation of the data. This self-awareness allowed them to make informed decisions about coding choices and to critically evaluate the emerging themes.

3.4.3.4 Tools and Strategies for Effective Coding

To facilitate effective coding, the author employed various tools and strategies. The digital data analysis tools used within this study for qualitative

data where NVivo and manual coding was done in Microsoft Word. Quantitative data was analysed through Microsoft Excel descriptive analysis tools.

Using the initial framing lenses the author began by manually coding the data sources in Microsoft Word to give them an in depth understanding of the data.

In terms of question 5 It training , I already had a good command of most of the IT implementation aspect . The project has prompted me to aim to make all aspects of my work as accessible as possible and to promote UDL to others as well as encouraging the implementation of accessibility tools . In terms of teaching, whilst working on the project, I specifically addressed the scaffolding of the tools that would facilitate aspects of the framework . I also listened to the learner voice more and made changes to meet needs. made me look at my whole teaching and assessment practice in terms of the UDL framework and guidelines
Given me a different perspective
My role within Kerry ETB changed from teaching to management in November 2022. This meant that I was unable to implement my UDL project idea. However, I believe that UDL is something which is very much part of Adult Basic Education (Literacy & ESOL) and participating in this project has impacted my teaching in a positive way .
It has enhanced and somewhat enabled what I considered learner voice prior to starting the project. Multiple means of representation is something I've adhered to as much as I could and communication with the learners is paramount to a good classroom environment .
It has given me an insight into the importance of student voice and how well even very young children understand how best they learn . I have increased the level of technology in the classroom . It has made me reconsider the idea of differentiation which would have been very prominent in my training and in previous class planning. I feel that UDL is a far more enriching than differentiating lessons .
In FET, we were practicing UDL to some degree but now it is completely influences the way I teach e.g. planning my lessons, delivering the lessons, reviewing work, planning exams etc.
Built awareness, reduce the work load for students, allows me to explore options as real options because of opportunities being facilitated
Changed my attitude and methodology towards how I expect homework/project to be completed. MADE me more aware of the talents and abilities of the student .
Overall it improved my teaching on a day-to-day basis. It enabled me to empower student voice by providing a choice for all, regardless of their cultural background, language abilities, or learning styles . I gained valuable knowledge on applicable learning strategies that I could use in my lessons. My lessons now possess multiple means of representation for students using technology that enables students to engage with the material from various perspectives.
UDL has made me think how I plan my lessons & how I create resources & how I assess students work
I am now confident that I am delivering classroom material in a way that is accessible to all my students . I have given my students voice in my classroom, it has transformed their engagement I can honestly say they enjoy my classes more.
As a teacher, it gave me a deeper understanding of what I can do to help students learn more and to understand how I can be a facilitator of learning rather than the person at the top of the classroom doing everything . Understand the importance of choice now .
It has bettered my teaching allowed students to be at the center of their learning and allowed me to discover the many talents and abilities students have
I have reorganised my teaching practice . I'm excited to bring the material I find online & share it with my students Classnotebook means more efficiency, more variety & happier students. More importantly it creates a link between school & home.
It has made me more aware of making sure everything is more accessible and also led to a refocusing to enable learners to become expert learners .
made a name on some of what I was doing . Create new types of material . further integrate technology into my assignments .

Figure 3-13 Line by line coding in Microsoft Word

Once this step was complete the author analysed the data in NVivo coding software so that visual representations of the thematic structure could be created (Appendix 10).

ID	Participants (Chromosome)	Text	Code	Reference
1	UDLCP-2-03	What does inclusive practice mean to you? Back students have a choice.		191
2	UDLCP-3-03	not sure		May15
3	UDLCP-3-08	to me, inclusive means all learners having access to the course content		May15
4	UDLCP-3-04	Allowing everyone to successfully learn don't know and be challenged within the same learning environment to include those with higher abilities and lower abilities		191
5	UDLCP-3-10	Inclusive practice means that every learner understands the learning intention, key words and recap. We have regular meetings where learner's educational needs are identified early on. I send out regular trainings and information on SEN.		191
6	UDLCP-3-11	Having a medium that is available to all and presented in a form that can be achieved by all.		May15
7	UDLCP-3-05	If means all my student reach their full potential and they go away with a value on their achievement and success which isn't always tangible. It means all students are given the same opportunity to learn, alongside their peers within the classroom regardless of any additional learning needs/styles. Teachers need to be able to match their teaching style to all of their students learning style.		191
8	UDLCP-2-04	Ensuring all students are learning and engaging in my class		191

Figure 3-14 NVivo Screen Capture of the Coding Process

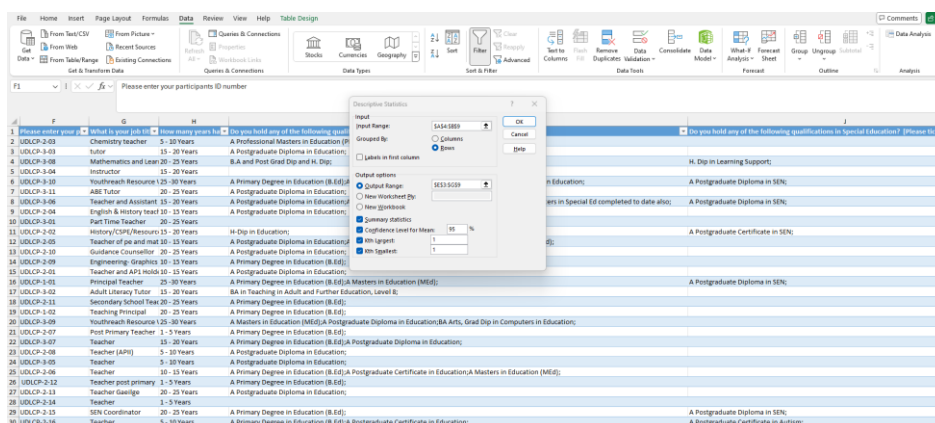


Figure 3-15 Screen Capture of Descriptive Analysis tool in Microsoft Excel

Quantitative data was analysed using descriptive analysis tools in Microsoft Excel.

3.4.3.5 Illuminating the Hidden Depths of Data

The coding process in reflexive thematic analysis is a dynamic and iterative journey that transforms raw data into meaningful themes. It is a process that demands active engagement, reflexivity, and the use of appropriate tools and strategies. By carefully navigating this process, the author uncovered hidden patterns, revealed underlying concepts, and generated insightful interpretations that will enrich understanding of the pathways to UDL implementation within Irish educational settings.

3.4.4 Triangulation

Triangulation Patton (1999) is a qualitative research methodology that involves the use of multiple methods or data sources to develop a comprehensive understanding of phenomena. This approach was particularly beneficial to the author as the study sample size was small, it offered a robust strategy to test the validity of the findings through the merging of information from different sources.

In qualitative research, small sample sizes are often a practical constraint. However, this limitation can be mitigated through triangulation, which allows the researcher to compensate for the size constraints by incorporating diverse perspectives and data types. By employing a mix of methods such as surveys, interviews, and self-reporting, the author was able to enrich their exploration

of the phenomenon, compensating for the potential lack of breadth that the small sample size might introduce.

Triangulation is especially beneficial in situations where a singular method might be insufficient to capture the complexity of the research question. The author was very conscious that the sample size was small and that their involvement with the participants may introduce unintentional bias. Therefore, they made a conscious decision to employ a number of data gathering options to support the participants to be as open and honest as possible.

One of the key benefits of triangulation in the context of small sample sizes is its role in testing the validity of research findings. Validity in qualitative research refers to the accuracy and credibility of the results. With limited sample sizes, there is an increased risk of bias or idiosyncrasies influencing the outcomes. Triangulation serves as a methodological safeguard against these challenges by ensuring that information converges across different sources. The convergence of information from multiple methods strengthens the validity of the research findings, creating a more robust and reliable outcome.

Moreover, triangulation can enhance the trustworthiness of the research by addressing potential researcher bias. By using multiple methods or involving different data sources, researchers can cross-verify and validate their interpretations. This not only adds a layer of objectivity to the study but also guards against the subjective influence that might arise from the researcher's own perspectives.

In the face of small sample sizes, triangulation also contributes to the depth and richness of the research. By tapping into varied data sources, researchers can uncover nuances and complexities that a singular method might overlook. This depth adds a layer of context and understanding to the findings, making them more robust and applicable despite the constraints of a limited sample.

Approaching triangulation requires careful planning and strategic execution to ensure the integration of multiple methods is both complementary and enriching (Carter, 2014). The author designed the research process to align various methods, ensuring that each approach contributed to a more holistic

understanding of the data. This process necessitated methodological rigour and reflexivity, particularly in the interpretation and synthesis of findings, to preserve the study's integrity. By integrating descriptive statistics with qualitative data, the author was able to construct a comprehensive profile of participants, capturing key characteristics such as sector affiliation, teaching experience, levels of satisfaction, understanding of UDL and inclusive practices, and engagement with school or centre management and staff.

This statistical background information provided crucial context for understanding participants' identities and attitudes towards UDL and inclusive practices, thereby enhancing the relevance and accuracy of the RTA coding process in refining themes and meanings. The use of multiple data sources and analytical methods deepened the understanding of participant data, allowing for a more nuanced and robust analysis. This approach not only strengthened the study's findings but also ensured that the complexities of participant experiences were thoroughly explored and represented.

3.4.5 Outputs of Design based Research.

McKenney and Reeves (2019) posit that a design-based research study should yield both theoretical and practical outputs. Theoretically, such studies contribute to the development of theories that describe, explain, and predict certain phenomena. They also extract theoretical understanding from empirical findings and provide knowledge that can be useful beyond the immediate research setting. Practically, design-based research addresses real problems of practice by creating educational interventions designed for actual implementation. These solutions are tested in authentic settings, with the ultimate goal of resolving real-world issues.

The author utilised the tool developed by Braun and Clarke (2021) for evaluating thematic analysis (TA) in manuscripts intended for publication to assess the validity of the themes and findings.

3.5 Ethics

Ethics was received from the School of Education Trinity College Dublin in September 2021. Data storage follow Trinity College Data Protection Policy and TCDs record retention schedule (Appendix 12).

This research addressed the following three questions:

1. How effective is a cross sectoral (primary, post primary and further education) Universal Design for Learning (UDL) community of practice in supporting the development of a UDL implementation model?
2. To what extent does including targeted professional development as part of a cross sectoral community of practice build teacher capacity to implement a UDL implementation model at whole school/centre level?
3. To what extent can a Universal Design for Learning (UDL) implementation model increase Irish educators ' ability to proactively support learner variability and diversity?

This study aimed to support educators at primary, secondary and further education, and training (FET) levels to create a UDL implementation process applicable to each sector that can be replicated in other schools and colleges across the Irish education system.

This study intended to document educators lived experience of designing and developing a UDL implementation process model through:

- Online QUAL +quan surveys through Microsoft Forms.
- Online qualitative interviews through Microsoft Teams.
- Online Community of Practice through Microsoft Teams.
- Online reflexive journals through Microsoft OneNote
- Teacher classroom observation with students undertaking a predefined piece of curriculum work.

Through the literature review, the author discovered a fundamental lack of empirical data on the implementation of UDL at both the classroom and whole school level. To ensure the validity of the research study, the author applied the UDL Reporting Criteria, which the Universal Design for Learning

Implementation and Research Network (UDL-IRN) research committee developed.

3.5.1 Informed Consent and Voluntary Participation

In this research study, obtaining informed consent from the participants was a fundamental ethical principle. In a DBR study it is crucial to clearly communicate the purpose, procedures, and potential risks and benefits of the study. The participants were made aware of what was expected of them, how their data would be used, and any potential impact on their professional role. Given the nature of the research, participants might have been more vulnerable to potential ethical concerns, and thus, ensuring voluntary and informed participation became even more critical.

The author emphasised that participation was entirely voluntary, and the participants should feel comfortable withdrawing at any point without facing consequences. Additionally, the consent process included information on how data were anonymised and safeguarded to protect the privacy of the participants these facts were reiterated throughout the study (Appendix 13).

3.5.2 Confidentiality and Anonymity

Preserving the confidentiality and anonymity of participants was paramount throughout the research study. Given that the study explored educators understanding of inclusive education and UDL approaches, participants may have shared personal insights and experiences that could be sensitive or potentially impact their professional reputation. The author needed to employ rigorous data protection measures, such as assigning pseudonyms to participants and removing any identifiable information from transcripts or reports. This safeguarded the anonymity of teachers, assuring them that their responses would not be linked back to them individually. The author also communicated clearly about the steps taken to ensure confidentiality, fostering trust between the author and the participants.

3.5.3 Respect for Participants' Autonomy

Participants in the DBR study were treated with respect at all times and their autonomy preserved. This involved recognising their professional expertise and allowing them to contribute willingly without coercion. The author refrained from imposing any interventions or changes to their teaching

practices without clear consent, ensuring that educators maintain control over their professional decisions.

Moreover, respecting autonomy extended to the dissemination of research findings. The author communicated the results in a manner that reflects the nuances and complexities of teachers' perspectives, avoiding any reductionist or misleading interpretations that could compromise the integrity of the study.

3.5.4 Addressing Power Dynamics

In educational settings, power dynamics between researchers and participants, especially when researchers hold authority in the academic context, need careful consideration. The author was very conscious that Educators may feel obliged to participate due to institutional expectations, creating a potential power imbalance.

The author openly addressed these power dynamics, emphasising the voluntary nature of participation and reassuring participants that their involvement would not influence their professional evaluations. By creating a supportive and non-coercive environment, the author sought to mitigate the impact of power differentials, allowing for more authentic and voluntary engagement from participants.

3.5.5 Ensuring Inclusivity in Research Practices

Given that the research focuses on inclusive education and UDL approaches, it was essential to embed inclusive principles in the research process itself. This included designing research materials that were accessible and supportive of diverse learning preferences, linguistic backgrounds, and abilities. The author was cognisant of the potential to exclude certain voices within the group of educators and actively sought ways to include diverse perspectives, ensuring a comprehensive understanding of inclusive education.

Moreover, the analysis and interpretation of data was conducted with cultural sensitivity and an awareness of the diverse backgrounds of the participants. The author strived at all times to avoid reinforcing stereotypes or making assumptions based on cultural or individual differences.

3.5.6 Data Collected for the Purpose of the Study

Throughout the study, various data types were employed to inform the findings. The iterative surveys were analysed both individually and collectively. Individual analysis provided a snapshot of the interventions' development, allowing for adjustments in line with the DBR methodology. These findings were then used to refine the intervention design. At the study's conclusion, the surveys were analysed collectively to develop codes and themes that contributed to empirical findings. The interviews were also analysed collectively, with their findings compared and integrated with the survey results to address the first two research questions regarding the effectiveness of the CoP and targeted professional development. Additionally, the participants' implementation reports were analysed to answer the third research question, which focused on the effectiveness of UDL in enhancing educators' ability to proactively support learner variability and diversity.

3.5.7 Ethical Use of Findings

The ethical responsibility of researcher extends beyond the data collection phase to the dissemination and use of findings. The author has been at all times open and transparent about their intentions for using the data and provided participants with a clear understanding of how the findings will be shared. Ensuring that the research contributes positively to the field of education and inclusivity is vital.

The author has provided participants with opportunities to review the preliminary research findings to ensure that their perspectives are accurately represented. This collaborative approach enhances the ethical integrity of the research process.

3.5.8 Continuous Ethical Reflection

Ethical considerations in a DBR study are not static; they require ongoing reflection and adaptation throughout the research process. Researchers should remain attentive to emerging ethical concerns, engage in continuous dialogue with participants, and be responsive to any issues that may arise. Regular check-ins with participants can serve as a mechanism for ensuring that ethical standards are upheld, and that the well-being of participants is prioritised.

By prioritising informed consent, confidentiality, respect for autonomy, addressing power dynamics, promoting inclusivity in research practices, and ethically using and disseminating findings, the author hoped to successfully navigate the ethical landscape of this study. Continuous reflection and a commitment to ethical principles are essential for fostering trust, ensuring the well-being of participants, and maintaining the integrity of the research process.

3.6 Research Planning and Design

As previously examined in Chapter One the study was a longitudinal study over two years which employed iterative cycles of analysis, design and evaluation. Below is a brief timeline of the study, the next section will examine the design and development of the cross sectoral CoP which was designed to answer the first research study question:

1. How effective is a cross sectoral (primary, post primary and further education) Universal Design for Learning (UDL) community of practice in supporting the development of a UDL implementation model?



Figure 3-16 Study Timeline

3.6.1 Educators as Co-Designers within the Study

In this DBR study, participants played a pivotal role as co-designers of the CoP design and PD interventions. Collaborating with the author, participants contributed their unique insights into classroom dynamics, student needs, and the contextual nuances of their learning environment. This collaborative design process ensured that interventions were not only theoretically grounded but also practical and relevant to the everyday experiences of educators and students (Fishman et al., 2013).

3.6.2 Implementation in Real-World Contexts

Anderson and Shattuck (2012) defined DBR as having the following characteristics: it is situated in a real educational context, it focuses on the

design and testing of a significant intervention, it adopts mixed methods to provide better guidance for educational refinement, it involves multiple iterations to reach the best design intervention, and it promotes collaboration between researchers and practitioners. These principles were integral to this study, with educators playing a pivotal role as co-designers of the CoP design and PD interventions.

The participants in this study served as key agents in the implementation phase of DBR. Their active engagement ensured that PD interventions were applied to authentic educational settings, allowing the author to observe the impact of the intervention on learning and teaching practices (Collective, 2003). Situated in real educational contexts, this study focused on designing and testing significant PD interventions that addressed practical needs within classrooms.

By adopting mixed methods QUAL +quan, the study provided a comprehensive view of how UDL principles could be integrated into various learning environments. Teachers' insights into the day-to-day realities of the classroom contributed to a more nuanced understanding of how the PD interventions influenced their existing curriculum design practices, teaching styles, and how they viewed diverse student characteristics. Dewey (1916) recognised that new meanings, values, and attitudes are effectively integrated into school culture when they are embodied and sustained within real-life contexts. This emphasis on practical application ensured that the PD interventions were both relevant and effective.

3.6.3 Examples of Participant Engagement in the Co-Design Process

Participants' engagement in the co-design process was characterised by active involvement at multiple stages, including:

Determining Topics and Schedules:

Rather than passively receiving pre-set PD content, participants identified and prioritised the areas they wanted to focus on, aligning these with their immediate professional needs. For instance, educators emphasised the importance of providing students with choices in assessments and requested

focused sessions on the UDL principle of action and expression, tailoring strategies to their classroom practices and students.

Knowledge Sharing:

Participants shared their professional experiences and successful classroom strategies. For example, the educational technology officer led sessions on tools available within the ETB that support UDL principles, demonstrating their use in real-life scenarios and fostering peer-to-peer learning. This exchange of knowledge enabled participants to apply practical insights directly to their own practices.

Resource Sourcing and Sharing:

Participants contributed by sourcing and sharing relevant teaching resources, and adding to the online resources provided by the author creating a constantly evolving collection of tools and strategies tailored to their schools' needs. This dynamic process encouraged participants to become active contributors rather than passive consumers, fostering a sense of ownership over the development process.

3.6.4 Active Involvement During UDL Implementation

During the implementation of UDL principles in their classrooms, participants took on leadership roles, such as:

Leading Sessions and Sharing Experiences:

Educators led sessions within their schools and centres, sharing strategies they had learned during CPD sessions. They also reported back to the CoP, discussing their experiences and collaboratively addressing challenges. For instance, participants exchanged ideas on adapting UDL strategies for different age groups and subject areas, which deepened their understanding and commitment to the approach.

3.6.5 Collaborative Problem-Solving:

Participants worked together to address real-time challenges, such as adapting UDL principles to diverse student groups. For example, they collaborated to design universally accessible lesson plans, ensuring solutions were both practical and context specific.

Cross-Sector Collaboration:

Educators from primary, secondary, and further education collaborated, sharing strategies and adapting them across educational settings. For instance, post primary teachers incorporated engagement techniques from a primary setting to better support younger and struggling students.

Fostering Ownership and Sustainability

Participants' hands-on involvement in both the design and implementation of the PD interventions cultivated a strong sense of ownership, ensuring the sustainability of these initiatives. Their deep understanding of their classrooms enabled them to anticipate challenges and proactively address them. For example, educators recognised the need for additional planning time to implement UDL strategies and collaborated with colleagues to share resources and lighten workloads.

3.6.6 Examples of Practical Participation**Peer Support Networks:**

Participants formed peer support groups within sectors to provide ongoing assistance during the implementation phase, sharing strategies, troubleshooting challenges, and offering moral support.

3.6.7 Iterative Feedback Cycles:

Continuous feedback from participants allowed CPD sessions to evolve based on real-world needs. For example, if a session on formative assessment was deemed too theoretical, subsequent sessions were adjusted to include more hands-on activities and concrete examples.

By embedding participants as active co-creators throughout the process, this study demonstrated the critical role of practical engagement in professional development. The co-design approach ensured that interventions were not only grounded in theory but also immediately applicable to educators' daily practices. This active involvement fostered a sense of ownership, ensuring the relevance, sustainability, and adaptability of the initiatives.

The study involved multiple iterations to refine the design interventions. Supporting educators in their role as implementers fostered a sense of

adaptability and responsiveness. As they navigated unforeseen challenges during their implementation, participants provided feedback to the author, which contributed to the iterative refinement of the study interventions, promoting continuous improvement (Cobb et al., 2003). This iterative process was crucial in refining the interventions to better meet the needs of the participants.

Moreover, the collaboration between author and practitioners was central to the study's success. This dynamic interaction created a symbiotic relationship, enriching the research process with the practical wisdom of those directly involved in the educational context. Research-Practice Partnerships (RPPs) have been defined as long-term collaborations between researchers and practitioners that leverage research to address persistent problems of practice (Coburn et al., 2013). This collaborative approach aligns with the principles of DBR, emphasising the active involvement of practitioners in the research process (McKenney & Reeves, 2019).

Participant's involvement as co-designers and implementers was crucial in adapting the interventions to real-world educational settings, ultimately fostering a more inclusive and effective learning environment.

3.7 Implementation model 'DESIGN'

Central to this PhD study is the 'DESIGN' model, developed by Reale (2020) and referenced in Costelloe & Reale (2021). This model advocates for a multi-stakeholder approach to assist educators and educational designers in creating genuinely inclusive learning environments for all students through the implementation of UDL. The model emerged during the COVID-19 pandemic, a period of significant volatility in global education (Purcell & Lumbreras, 2021). The pandemic posed significant threats to traditional education systems, as students and educators faced unprecedented barriers to access. Without the integration of technology, traditional education would not only have been restricted but virtually inaccessible. The pandemic underscored the necessity for multiple access points and increased flexibility

within the education system.



Figure 3-17 UDL Implementation Process Model (Reale 2020)

The function of the DESIGN model was to contribute to the professional learning of participants by providing a framework that enables them to identify their own professional development needs concerning UDL implementation. It highlights five key elements of effective educational design to support inclusive practices.

3.7.1 Diversity

The concept of diverse learners is well-established both in literature and policy, and significant efforts have been made over the past decades to enhance inclusivity in classrooms by developing strategies to support students with additional needs. The Irish education system, in particular, has implemented rigorous support systems for these students and continues to strive towards creating opportunities for marginalised students to participate

more fully in the educational process. However, these supports and accommodations are often designed to fit within traditional modes of teaching and learning, which can be limiting.

The COVID-19 pandemic forced a sudden shift away from traditional learning environments, highlighting their inherent limitations and the ways in which they can be disabling if not purposefully designed. This disruption has brought to light a broader issue of diversity, one that affects not only the traditionally marginalised minority of diverse learners but all students (Aucejo et al., 2020). Despite the challenges posed by this unplanned change, there were opportunities for growth and improvement.

By adopting the principles of the UDL framework, participants can leverage flexible design to support students in identifying and utilising their strengths. UDL emphasises multiple means of engagement, representation, action, and expression, which can create a more inclusive and effective learning environment for all students. This approach aligns with the need for educational systems to be adaptable and responsive to the diverse needs of the entire student population.

3.7.2 Educators

The need to build digital capacity among educators has never been greater, as highlighted by the National Forum for the Enhancement of Teaching and Learning in Higher Education (2020). Educators must not only be adept at teaching through technology but also capable of identifying the most suitable technologies for their specific disciplines. Additionally, they need to support students in leveraging technology to find solutions and approaches that align with their individual learning preferences.

Implementing the principles of UDL requires educators to possess robust digital skills to effectively support diverse learner needs. This model emphasises the importance of PD to ensure educators are at the forefront of technology adaptation within their subject areas. Such professional development is crucial for enabling educators to support students in using technology to scaffold their learning, thereby creating environments that foster exploration and the development of independent, self-directed learners (Grant & Pérez, 2018).

Moreover, this approach emphasises the significance of PD in the areas of accessibility, inclusion, and UDL. By equipping educators with the necessary digital competencies, we can ensure that they are prepared to create inclusive learning environments that cater to the diverse needs of all students.

3.7.3 Students

Digital literacy has become a fundamental component of basic literacy, essential for every learning path, regardless of discipline. Moving forward, technology-supported learning is poised to become the cornerstone of our education system (Reddy et al., 2023). The COVID-19 pandemic has highlighted significant disparities in access to digital devices and broadband, disadvantaging some traditionally successful students in much the same way that disabled students have been disadvantaged by traditional access issues.

The outdated concept of accommodations for students with additional learning support needs is unsustainable in this new educational landscape. The 'new normal' a concept that was proffered during the pandemic years 2020 -2023 offered an opportunity to reimagine the accommodations model of responding to diversity. Instead, leveraging UDL -based approaches that empower students to become expert learners, self-aware individuals capable of adapting any learning environment to their unique needs. By providing students with multiple means of engagement, action, and expression, we place them at the centre of the learning process, both supporting and challenging them to take ownership of their education.

3.7.4 Innovation

Drucker (1980, p. 37) contends that "the greatest danger in times of turbulence is not the turbulence; it is to act with yesterday's logic." UDL provides an opportunity to leverage flexible design supported by technology to foster a more equitable and genuinely inclusive learning environment for all students. The integration of everyday technology into education has the potential to offer unprecedented levels of access and engagement.

However, educators need to be provided with opportunities to develop skills to be more innovative in their teaching practices. The rapid transition to remote learning during the pandemic has revealed new possibilities and challenged long-standing practices that were previously considered indispensable (Quality

and Qualifications Ireland, 2020, p. 172). This period of upheaval has equipped institutions with valuable insights and understanding. It is now crucial for them to reflect on how to incorporate this newfound knowledge to enhance and transform educational practices in meaningful ways.

3.7.5 Goals

The UDL framework is predicated on the recognition of learner diversity from the outset, embedding flexibility into the curriculum to support all learners. For UDL to be effectively implemented, it requires a sustained commitment and broad adoption across institutions to ensure the quality of delivery, continuity of access, and adequate support for every learner.

UDL is not a static model but rather a dynamic, ongoing process of learning and refinement (Fornauf & Erickson, 2020). Therefore, institutions should develop a comprehensive implementation plan integrated into all aspects of the learning process. For this plan to be successful, it should be realistic, progressive, and aligned with clear goals and targets for the institution, its staff, and its students. This approach facilitates a structured and adaptive implementation of UDL principles, fostering an inclusive and supportive learning environment.

3.7.6 Nurture

UDL is most effectively implemented when it is integrated as a central component of the school's development plan, leveraging both top-down and bottom-up approaches. This integration ensures that UDL becomes an intrinsic part of the institution's culture and quality assurance processes. Popovic and Plank (2016) emphasise the importance of employing a dual approach, combining top-down directives with bottom-up initiatives, to effectively drive institutional change. Rao (2019) supports this view by highlighting that student involvement in collaborative, ongoing training and curriculum development fosters an inclusive and engaging learning environment.

To facilitate the adoption of UDL, it is crucial to provide structured support for both staff and students. Utilising established frameworks such as the "Dive Into UDL" method Grant and Pérez (2018) can be highly beneficial. This three-stage process helps staff assess their current level of understanding and offers a clear roadmap for their professional development. By scaffolding the

adoption process in this manner, institutions can better support the effective implementation of UDL principles and promote a more inclusive educational experience. The DESIGN model served as an initial framework to support participants to frame their understanding of UDL practice the complexity of designing UDL implementations for their own learning environments. A core principle of the study was to harness participants knowledge and experience to develop the study design to meet their PD needs.

3.7.7 Effective Change Cycle Model

As a direct outcome of the co-design process within the study, the author developed a UDL effective change cycle model to assist participants in integrating UDL into their own practices and to establish the groundwork for extending their implementations to their broader learning and teaching communities. The study sought to support participants to develop their unique implementation styles and strategies that were contextually effective and pedagogically sound. This model serves as a framework to support them in developing their own implementations.

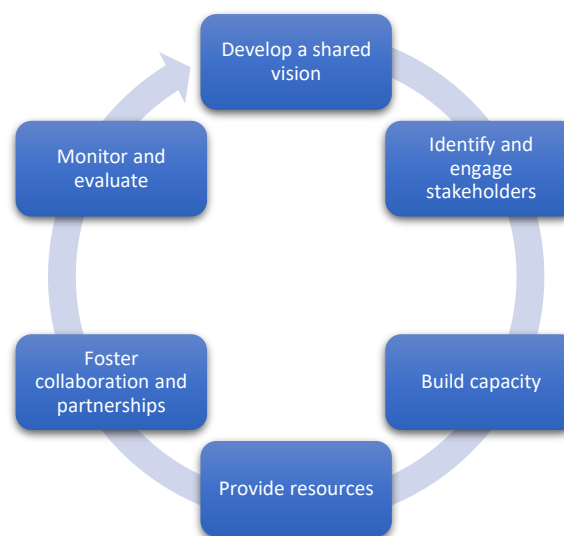


Figure 3-18 UDL Effective Change Cycle Model Reale (2023)

In order to effect change the following areas need to be addressed:

1. **Develop a shared vision:** The first step in developing an UDL ecosystem that supports inclusive education for all is to establish a shared vision among all stakeholders. This involves setting goals and

objectives that prioritise the needs of diverse learners and creating a common understanding of what UDL means.

2. **Identify and engage stakeholders:** UDL implementation requires the participation and collaboration of a wide range of stakeholders, including educators, parents, students, community members, and policymakers.
3. **Build capacity:** UDL implementation requires educators to have the knowledge, skills, and attitudes needed to support diverse learners.
4. **Provide resources:** UDL implementation requires a range of resources, including materials, technology, and specialised equipment, to support the needs of diverse learners.
5. **Foster collaboration and partnerships:** Collaboration and partnerships among stakeholders are critical for developing and sustaining an educational ecosystem that supports inclusive education.
6. **Monitor and evaluate:** Regular monitoring and evaluation are critical to ensure that the educational ecosystem is meeting the needs of diverse learners. Collect data on student outcomes and feedback from stakeholders to identify areas of improvement and make necessary adjustments to the ecosystem.

Through this process, participants were given a structured framework to evaluate their current application of UDL principles and identify areas for enhancement. This approach challenged traditional notions of inclusive practice by emphasising proactive planning for variability rather than reactive differentiation (Flood & Banks, 2021). It required a fundamental shift in educators' mindsets towards diversity, equity, and inclusion, highlighting the necessity of robust professional development to support this transformative change.

For many participants, recognising that UDL is not merely about differentiation but about empowering all students to reach their full potential represented a significant paradigm shift. To foster enduring change, it was essential to understand the complexities of existing educational environments and practices. UDL, as both a framework and mindset, promotes inclusive thinking and planning across all levels of the education system, necessitating its integration into the narratives of all stakeholders.

The design of this study aimed not only to impart knowledge about UDL principles but also to establish a UDL ecosystem where participants could experience and observe its impact firsthand. The first year was dedicated to building this ecosystem, during which participants were introduced to the UDL framework, mapped its components to their current practices, and shared their insights with peers. Weekly sessions facilitated collaborative small-group work and collective discussions, encouraging participants to explore UDL implementation at both individual and community levels within their schools and centres.

Resources were provided in various formats, granting participants the autonomy to engage with the learning environment in ways that challenged their existing beliefs about learning (Novak, 2019). They learned that true "voice and choice" in learning necessitates the development of capacity, a concept addressed through the extensive PD delivered by the author in collaboration with Kerry ETB's educational technology officer.

The study's learning space was designed in alignment with Honebein's (1996) seven pedagogical goals for constructivist learning environments:

1. Offering experiences with the knowledge construction process, allowing learners to shape their learning methods.
2. Encouraging the exploration and appreciation of multiple perspectives by evaluating alternative solutions.
3. Embedding learning in realistic contexts through authentic tasks.
4. Promoting ownership and voice in the learning process to foster student-centred learning.
5. Embedding learning within social experiences to enhance collaboration.
6. Utilising multiple modes of representation (e.g., video, audio, text).
7. Encouraging reflection and metacognition to raise awareness of the knowledge construction process.

This comprehensive codesign process not only facilitated the integration of UDL principles but also empowered participants to transform their teaching practices in ways that resonate authentically within their educational contexts.

3.7.7.1 Understanding a UDL Ecosystem

This study is grounded in Bronfenbrenner's (1979) Ecological Systems Theory (EST), which explores the intricate interactions between individuals and their environments. Inclusive education, viewed as a social construct, emerges from the dynamic interplay of relationships among individuals and societal systems. According to Anderson et al. (2014), what we recognise as inclusive education arises from these complex interactions and constructs.

The primary objective of this study was to support participants to understand the complex nature of UDL implementation and to help build agency. Fullan (2014) noted that effective implementation involves changes in curriculum materials, instructional practices, and teachers' beliefs and understandings. Rose and Meyer (2002) emphasise the need for technology infrastructure, administrative support, teacher education, redefined roles for educators, new curriculum planning models, community involvement, and creative funding for UDL implementation at the local level. The author sought to address this complex issue by developing a UDL ecosystem framework (which will be detailed later in this section) to support the participants through PD to map the complex networks and interconnected systems within schools and educational centres to the UDL framework. This approach was designed to empower participants to develop effective UDL implementations. By examining the various systems and individuals impacting the implementation designs, participants were better equipped to plan proactively and anticipate potential challenges and barriers.

The research aims to investigate what a comprehensive UDL learning experience might entail from a teacher's perspective. To achieve this, the study examined all contributing factors to the learning environment, both within and beyond the teacher's control. Educational systems are intricate networks of individuals, organisations, and resources that interact to facilitate learning. Understanding these dynamics is crucial for developing effective UDL implementations and fostering an inclusive learning environment.

The Irish education system consists of primary and post-primary schools, providing education to children from at least age 5 to 16 or until they have completed a minimum of three years of post-primary education. Schools must

adhere to their admissions policies and notices, accommodating an increasingly diverse student population. Since 2017, the Special Educations Teacher Allocation Model (SETAM) DES (2017) has provided each mainstream school with a fixed allocation of special education teachers, determined by the school's size and educational profile. SETAM deployment is framed by the Continuum of Support, a multi-tiered system of support. This model supports a more integrated approach to addressing diverse students' needs but underscores the necessity for a consistent, institution-wide approach to inclusive design and support.

Many students continue their education beyond the post-primary level, advancing to further and third-level education. State-funded education is available at all these stages. The Education and Training Boards (ETBs) oversee a range of adult and further education and training programs nationwide. These include Post-Leaving Certificate (PLC) courses, which offer technical and practical education and serve as a pathway to higher education. Other ETB programs include the Vocational Training Opportunities Scheme (VTOS) for adults seeking second-chance education, Youthreach for early school leavers, various literacy and basic education initiatives, and self-funded evening adult programs. Participants in this study were drawn from across all levels within ETBs, reflecting the broad spectrum of educational experiences among educators within this framework.

Given the multifaceted and complex nature of the Irish education system, fostering collaboration among educators from various sectors was crucial. Building a shared understanding and exchanging practices were essential to cultivate a supportive community and enhance educational outcomes.

The infographic below illustrates the UDL ecosystem Framework designed by the author, highlighting the key aspects of the environment and culture that

were explored in constructing this ecosystem.

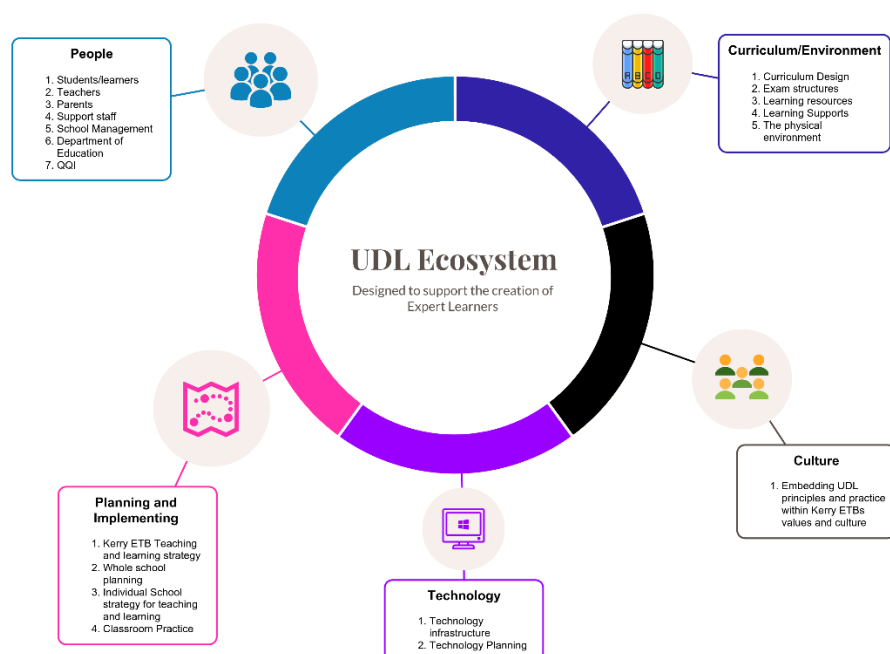


Figure 3-19 UDL Ecosystem Framework

3.7.7.2 Five Stages of the UDL Ecosystem

People

In the implementation of a Universal Design for Learning (UDL) plan, the involvement of all stakeholders in the design, planning, and development phases is crucial for ensuring effective implementation. As highlighted in Section 2.5.2.2, communication is fundamental to the design process. UDL is an inclusive practice undertaken with, rather than for, individuals. Thus, it is necessary to engage learners, educators, parents, support staff, and school management, while also considering the implications of broader educational policies and mandates on the implementation process.

Curriculum/Environment

The primary school curriculum was designed in 1999 it consists of an eight-year cycle: junior infants, senior infants, and first to sixth classes it was revised in 2019 and extended in 2023. The primary curriculum aims to provide a broad learning experience and encourages a rich variety of approaches to learning and teaching that cater for the different needs of individual children. The

primary curriculum is designed to nurture the child in all dimensions of his or her life—spiritual, moral, cognitive, emotional, imaginative, aesthetic, social and physical. Some aspects of the primary curriculum are under review.

The Primary Curriculum Framework 2023 is for all primary and special schools and will guide the work of teachers and school leaders as they enhance learning, teaching, and assessment for all children from junior infants to sixth class.

The framework sets out the vision, principles, key competencies, structure, approaches to learning, teaching and assessment, and time allocations for the redeveloped curriculum.

It links with Aistear: the Early Childhood Curriculum Framework and connects with the Framework for Junior Cycle supporting continuity of experiences for children from early childhood through primary school and into their post-primary education.

The framework presents five broad curriculum areas; Arts Education, Language; Social and Environmental Education (SEE); Science, Technology, Engineering and Maths (STEM) Education, and Wellbeing. The development of curriculum specifications for each of these areas is underway and draft specifications were published for extensive consultation in 2024.

Junior Cycle caters for students in the first three years of their post-primary education.

The junior cycle was introduced on a phased basis between September 2014 and September 2021. It features revised subjects and short courses, a focus on key skills, and new approaches to assessment and reporting. Schools have more freedom to design junior cycle programmes that meet the learning needs of all students. For students, the junior cycle curriculum available in their schools is a mix of subjects and short courses as well as other learning experiences.

Classroom-based assessments

During second and third year, students complete a number of Classroom-Based Assessments. In addition to classroom-based assessments, students

complete state examinations at the end of their three-year junior cycle and receive a Junior Cycle Profile of Achievement.

For a small group of students with special educational needs, priority learning units (PLUs) are provided as part of the Framework for Junior Cycle (DE, 2015), Level 1 Learning Programmes (L1LPs) and Level 2 Learning Programmes (L2LPs). These components enable the statements of learning and key skills to become a reality for these students throughout their three-year junior cycle.

Senior cycle education in Ireland may be of two or of three year's duration. Students may follow a two-year Leaving Certificate programme, or they may take an additional optional year at the start of their senior cycle. This year is called Transition Year.

Most students take the Leaving Certificate examination at the end of their senior cycle. Students normally choose 6 to 8 subjects from the list of approved subjects.

Students following the Leaving Certificate Vocational Programme (LCVP) take 6 or 7 Leaving Certificate subjects and two additional Link Modules: Preparation for the World of Work and Enterprise Education.

Leaving Certificate Applied (LCA) students follow a pre-vocational programme made up of a range of courses that are structured round three elements: Vocational Preparation, Vocational Education and General Education.

The Senior Cycle Level 1 Learning Programme and the Senior Cycle Level 2 Learning Programme have been developed by the National Council for Curriculum and Assessment (NCCA) as follow on programmes for students who are progressing from Level 1 Learning Programmes (L1LPs) and Level 2 Learning Programmes (L2LPs) at junior cycle and are to be implemented from September 2024.

FET offers the opportunity to engage in learning in virtually every community in Ireland regardless of any previous levels of education and a pathway to progress as far as any individual wants to go. Serving around 200,000 unique learners each year, FET provides a continuum of learning opportunities from Level 1 to Level 6 of the National Framework of Qualifications (NFQ) as set out below.

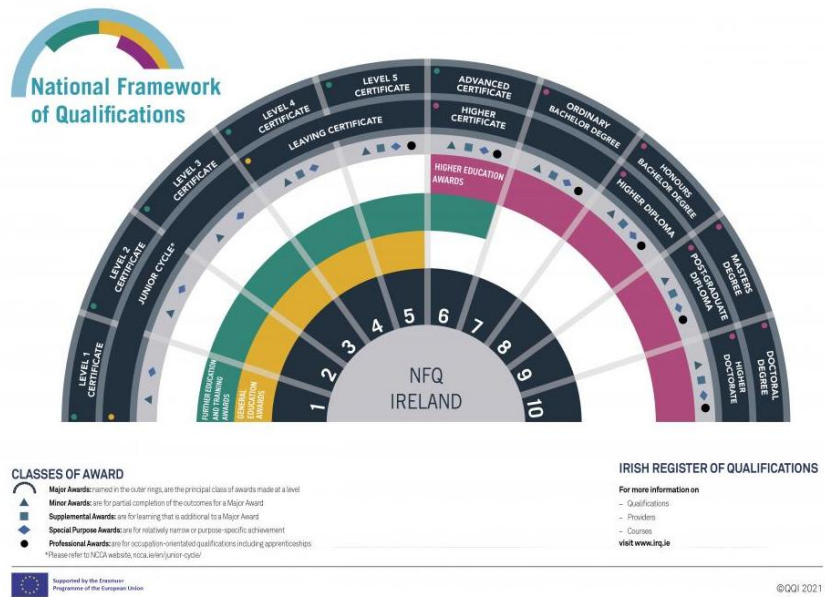


Figure 3-20 National Framework of Qualifications

A quick examination of the curriculum in each sector highlights the complexities in administering any form of pedagogical change.

Culture

Kerry ETBs core values centre on ensuring that every person has a right to access education and training opportunities to realise their potential. “We will actively implement these values through our actions and behaviours”.

Our Values



Figure 3-21 Kerry ETBs core values

Their mission is “To create and promote the development of a lifelong learning society in Kerry, so that all who live there have access to the education and training required to fulfil their potential and to meet their personal, social, cultural, economic and civic needs”.

Technology and Infrastructure

Kerry ETB promote technology enhanced learning pedagogies across all learning environments supported by a robust ICT infrastructure supported by a dedicated educational technologist.

Planning and Implementation

Kerry ETB as part of their institutional strategic planning and goal-setting process aimed at ensuring the ongoing development and enhancement of learning and teaching provisions, they have incorporated the UDL principles into the objectives specified in goals 2, 3, and 4 of their strategic plan. This integration communicates to all stakeholders the critical importance of UDL as a framework to be embedded across all areas of provision.

GOAL 2: QUALITY TEACHING AND LEARNING

- 2. Support and resource inclusive/differentiated teaching and learning practices in all of our schools/colleges/centres/programmes.

GOAL 3: INNOVATIVE EDUCATION AND TRAINING RESPONSES

- 4. Continue to renew and develop new responses to enhance engagement in education and training activities.

GOAL 4: ACCESS AND PROGRESSION

- 5. Implement strategies and commit resources to ensure that core literacies (literacy, numeracy, critical thinking, digital and computer literacy and employability skills) are embedded within all of our programmes and courses.

Figure 3-22 Kerry ETBs Strategic Goals

3.7.7.3 Reflection and Feedback

The participants reflexive practices were integral to the success of this DBR study. As they implemented interventions, participants systematically reflected on their experiences, providing valuable insights into the factors influencing the success or failure of the intervention Penuel et al., (2016) which they consistently shared with the group. This reflexive feedback loop contributed to the ongoing refinement of interventions, ensuring that they remained responsive to the evolving needs of the educational context.

The author, in collaboration with the participants, used this reflexive feedback to refine and adapt the PD interventions in subsequent cycles of the DBR process (Anderson & Shattuck, 2012). The iterative nature of DBR acknowledges that interventions are not static but evolve based on the continuous feedback loop between researchers and teachers. This dynamic relationship enhances the ecological validity of the research findings and increases the likelihood of successful implementation in diverse educational settings (Cobb et al., 2003).

3.7.7.4 Professional Development and Empowerment

Participation in DBR studies empowers educators as professional researchers, fostering a culture of continuous learning and improvement. Engaging in collaborative research activities enhances teachers' research literacy, allowing them to critically analyse educational practices, assess the impact of interventions, and contribute to the broader knowledge base in their field (Creswell, 2012).

Furthermore, the collaborative nature of DBR promotes a sense of collective efficacy among teachers. As they witness the tangible impact of their contributions on the development and refinement of interventions, educators become advocates for evidence-based practices within their professional communities (Penuel et al., 2016). This shift towards a culture of inquiry and evidence-based decision-making has lasting implications for educational improvement beyond the scope of individual DBR studies.

3.7.8 Community of Practice (CoP)

This study was designed around the creation of a cross-sectoral online CoP. Buysse et al. (2003) emphasise that CoPs, rooted in collective expertise and aimed at evaluating and enhancing education, enable practitioners and researchers to co-construct knowledge. This collaborative approach encourages participants from various sectors to share, expand, and transform their understanding of effective UDL practices (see section 2.7.1.). According to Wenger (1998), an effective CoP is built on three main principles: mutual engagement, a joint enterprise, and a shared repertoire. Whinnery et al. (2020) found that staff who participated in UDL communities of practice valued the support and noted significant program improvements and a stronger culture of collaboration.

Adams et al. (2023) identify five essential stages in the evolution of Communities of Practice (CoPs): 1) Envisioning, 2) Designing, 3) Facilitating, 4) Evaluating, and 5) Sustaining. These stages underscore their effectiveness in supporting ongoing professional development among educators. These stages of CoP design align with the three stages of McKenney and Reeves' (2019) DBR model: 1) Analysis and Exploration, 2) Design and Construction, and 3) Evaluation and Reflection, as employed in this study. This alignment fosters a

cohesive study design.

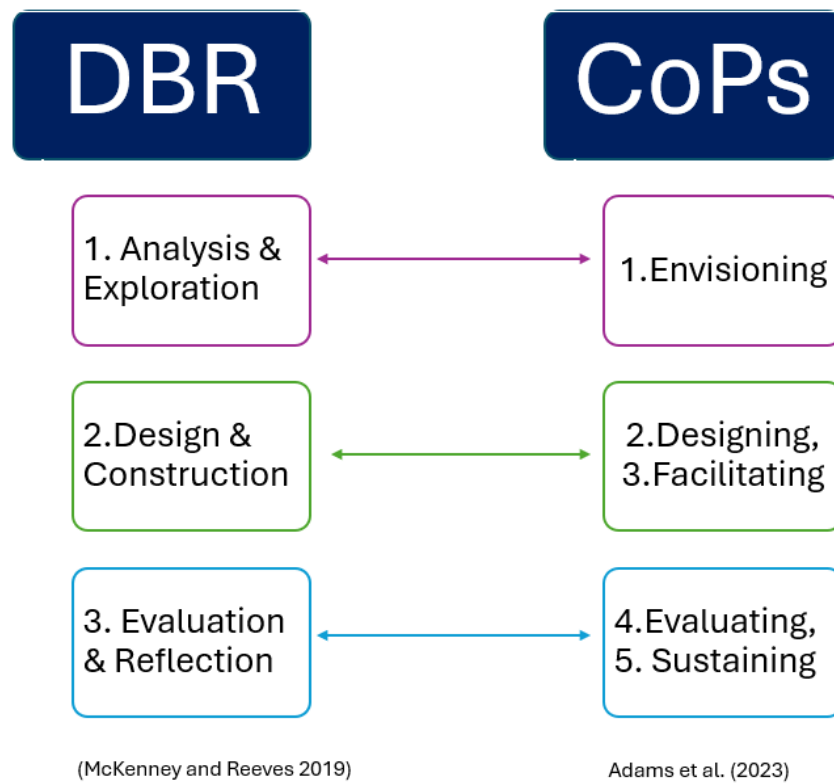


Figure 3-23 DBR and CoP Models

3.8 The Community of Practice Space

3.8.1 Envisaging

Two primary constraints in the design of this study were social and geographical. As previously stated, this study was conducted during the COVID-19 pandemic years, necessitating adherence to social distancing guidelines, which precluded in-person meetings. Additionally, the participants were geographically dispersed, making it impractical to find a central location that could accommodate weekly meetings. Consequently, the author needed to explore technological solutions that could robustly support the project's requirements. These included providing a space for training, enabling active communication, hosting resources, offering individual and public spaces, establishing collaboration areas, and facilitating group discussions. Furthermore, the technology needed to support reflexive practices.

A stipulation imposed by the author on the technological resources was that only existing technology could be utilised. The rationale for this decision was to ensure equitable access for all participants and to maintain cost neutrality, allowing the study's design to be replicated in other contexts using the same principles. The study space design also needed to adhere to the three principles of UDL. This meant providing participants with multiple ways of accessing the space, presenting resources in various formats (e.g., video, audio, text), incorporating built-in assistive technology, and enabling participants to express their understanding meaningfully through multimedia.

To evaluate the suitability of the chosen online platform, the author utilised the C4P framework Content, Conversation, Connections, Context, and Purpose as part of the Designing and Facilitating phase of the CoP design. Developed by Hoadley and Kilner (2005), the C4P framework posits that effective knowledge generation and sharing occur when purposeful conversations are held around content within a specific context.

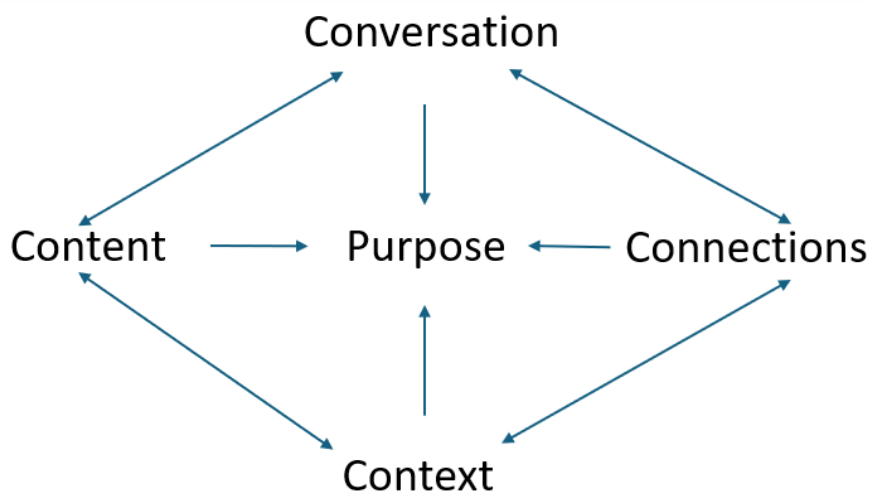


Figure 3-24 C4P Framework

1. **Content:** This aspect focuses on the quality and relevance of the materials and information provided on the platform. The chosen platform needed to support diverse content formats and ensure that the educational materials were accessible and aligned with UDL principles.

2. **Conversation:** Effective knowledge sharing relies on meaningful dialogue. The platform was evaluated based on its ability to facilitate interactive and purposeful conversations among participants, thereby enhancing collaborative learning and engagement.
3. **Connections:** This element assesses how well the platform supports the development of relationships and networks among participants. The platform's ability to foster connections between individuals, their ideas, and their experiences was crucial for the CoP's success.
4. **Context:** The platform needed to provide a context that was relevant to the participants' educational environment. This involved ensuring that the platform's features and tools were adaptable to the specific needs and practices of the participants.
5. **Purpose:** The evaluation considered whether the platform aligned with the overall goals and objectives of the CoP. It was essential that the platform supported the intended purposes of professional development and UDL implementation effectively.

By applying the C4P framework, to the study platform design, the author aimed to ensure that the selected platform was not only effective for content delivery but also facilitated dynamic discussions, fostered meaningful connections, and aligned with the broader educational context and objectives. This comprehensive evaluation ensured that the platform supported a robust and purposeful CoP, thereby promoting a conducive environment for achieving significant educational outcomes.

3.8.2 Designing and Facilitating

3.8.2.1 Content

The platform employed for hosting and accessing content in this study was Microsoft Teams, supplemented by OneNote Staff Notebook. A central tenet of this study was the exclusive use of technologies that are widely available to all participants within the Kerry ETB. This dual-purpose approach allowed participants to engage with the content from both learner and teacher

perspectives. The CoP content was designed to support both individual and group learning effectively.

The literature highlights the critical role of PD in enhancing educational outcomes and achieving high-quality teaching, which significantly impacts student learning (Darling-Hammond, 1997; Hattie, 2012). Effective PD is pivotal for sustained improvements in teaching and learning outcomes by tailoring learning experiences to align with the needs of educators and students (Darling-Hammond et al., 2009). This study was designed to equip educators with the essential skills and knowledge of UDL to address the diverse needs of students effectively. By providing targeted PD, the study aimed to foster quality teaching that would significantly enhance student learning outcomes (Darling-Hammond, 1997; Hattie, 2012).

While documentation specifically focusing on UDL-related PD is limited, existing literature highlights several critical components necessary for fostering meaningful changes in teaching practices. UDL-focused PD must offer substantial professional support and instruction tailored to educators' needs. Fixsen et al. (2009) emphasise that such support should be integrated with broader educational initiatives rather than functioning in isolation. Isolated PD can lead to fragmented learning experiences that lack sustainability and fail to induce significant pedagogical shifts.

To mitigate this fragmentation, Darling-Hammond and Richardson (2009) advocate for collaborative approaches to PD. Their research suggests that effective PD should be intensive, ongoing, and closely tied to educators' daily practices. It should focus on specific academic content, align with other school initiatives, and foster strong professional relationships among teachers. The study's design incorporated robust feedback and reflexive processes, allowing participants to assert their voices and make informed decisions throughout their learning journeys. This iterative approach enabled continuous refinement and delivery of targeted, contextually relevant PD that promptly addressed participants' needs. The platform also facilitated participant-generated content, promoting the sharing of relevant support among peers and fostering a collaborative co-development environment (Elmore, 2004).

Effective professional development requires educators to demonstrate commitment and confidence in their profession, addressing their knowledge, skills, attitudes, and instructional methods. Vygotsky's theory suggests that cognition is closely linked to actions and behaviours (Lantolf & Appel, 1996). Understanding teachers' discourse can reveal their underlying perceptions and expectations, aligning with Vygotsky and Cole's (1978) concept of the Zone of Proximal Development (ZPD) the space between independent and guided learning. Sociocultural theory emphasises the importance of social interactions during training as crucial for teacher development, advocating for collaborative learning activities with peers and mentors to enhance pedagogical expertise. Therefore, PD initiatives should facilitate collaborative work, dialogue, knowledge sharing, and reflexive practice, promoting scaffolding to support educators' growth in a nurturing environment.

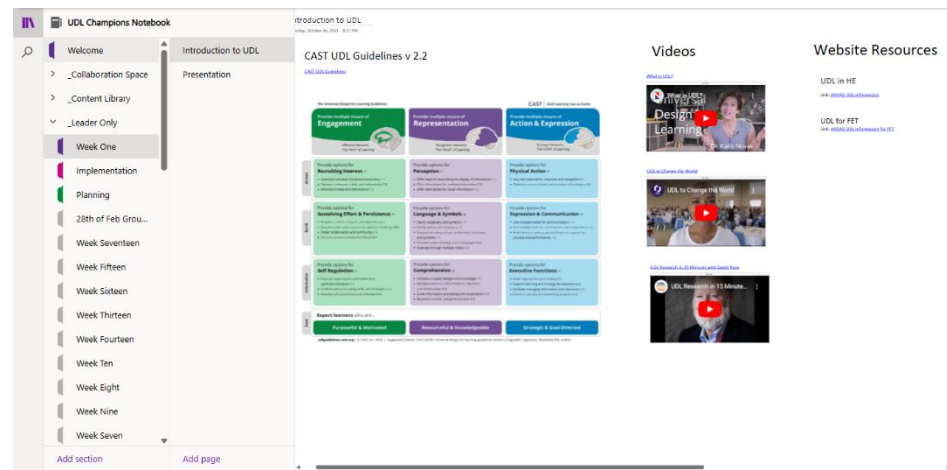


Figure 3-25 Example of Content media in OneNote

Accessibility is a fundamental principle of UDL, and the choice to utilise Microsoft Teams and OneNote was pivotal in ensuring that all participants had unrestricted access to content. This decision was strategically aligned with UDL's core tenets by incorporating Microsoft Immersive Reader technology, which offers assistive features such as text-to-speech and translation capabilities. Additionally, the inclusion of speech-to-text functionalities through the microphone further enhanced accessibility and inclusivity for all participants.

By leveraging Microsoft Teams and OneNote, the study facilitated collaborative, ongoing PD that aligns with UDL principles: multiple means of

engagement, representation, and action and expression. These technologies provided a platform that not only addressed the accessibility needs of diverse learners but also supported effective PD practices as described in the literature. The immersive and inclusive environment enabled educators to both experience and apply UDL practices, fostering a comprehensive approach to professional growth and contributing to improved educational outcomes.

The design of the CoP environment and content was intentionally guided by UDL's three core principles:

Multiple Means of Engagement: Content and interactions were structured to maintain participant interest and motivation, catering to diverse learning preferences and promoting sustained engagement.

Multiple Means of Representation: Information was presented in various formats, including text, video, and audio, to accommodate different ways participants process and understand content.

Multiple Means of Action and Expression: Participants were encouraged to demonstrate their learning and express their understanding through varied modalities, allowing for personalised and meaningful responses.

This design ensured that participants could engage with the content in ways that were both accessible and aligned with UDL principles. By delivering content in diverse formats and providing a range of interactive opportunities, the study aimed to support the practical implementation of UDL and promote a holistic approach to professional development.

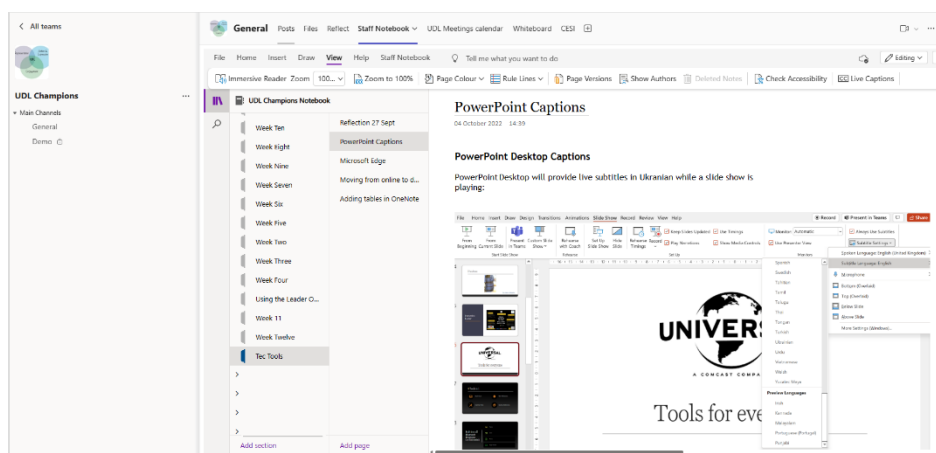


Figure 3-26 Example of OneNote Design

3.8.2.2 Conversation

Conversation serves as the primary vehicle for knowledge sharing within a CoP. Through dialogue, members exchange ideas, pose questions, and offer feedback. Vygotsky highlights the pivotal role of semiotic mediation, particularly verbal interaction and social engagement, in the learning process. Language functions as a symbolic tool that mediates higher-order cognitive functions like reflection and learning (Swain et al., 2015). Research indicates that adults utilise private speech for intra-psychological purposes, especially when tackling challenging tasks, thereby serving as a mediating mechanism in problem-solving. Collin and Karsenti (2011) suggest that, in addition to cognitive reflection, educators benefit significantly from verbal interactions with peers and colleagues. This underscores the interconnectedness of human cognitive and social dimensions and elucidates how educators develop their thinking and professional practices (Johnson, 2007).

To facilitate open and honest conversations, the technology employed in the study enabled group meetings where all participants could freely share ideas and information. Additionally, breakout rooms allowed for more focused discussions, complemented by text-based interactions through chat functionalities. The author applied Socratic questioning to guide discussions within these breakout sessions, drawing on (Maiorana (1991) and Yang et al. (2005)), who assert that Socratic questioning enhances students' critical thinking skills by fostering idea exchange, exploring content applications to real-world problems, and considering implications for practical situations. At the conclusion of each breakout session, participants were encouraged to share insights and opinions derived from the Socratic discussions with the entire group. Furthermore, participants had unrestricted access to the platform, empowering them to schedule separate meetings with individuals or groups to further extend discussions.

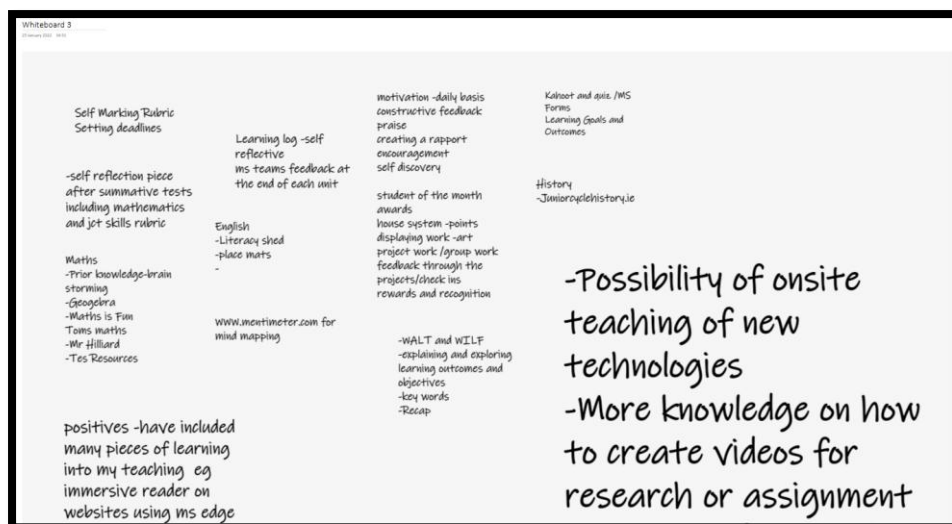


Figure 3-27 Example of Microsoft Whiteboard Collaboration

3.8.2.3 Connections

Connections within a CoP represent the relationships forged among its members. According to Mayne et al. (2015), CoPs serve not only as spaces for sharing knowledge and practices but also for generating innovative approaches. They redefine interactions between novices and experts in academic settings, akin to mentor-mentee relationships. Bandura's theory posits that individuals predominantly learn behaviours through observational modelling Bandura (1977), highlighting how these connections enable knowledge and resource sharing while fostering trust and rapport.

This diverse participation facilitated weekly meetings among colleagues who typically wouldn't interact, fostering relationships grounded in trust. The literature advocates for educators engaging in collaborative learning with peers and more experienced colleagues to enhance professional skills and knowledge. Effective professional development should foster collaborative work, reflexive discussions, and the sharing of experiences (Vygotsky & Cole, 1978). The study also endeavoured to have two representatives from each school or centre to nurture connections within their respective learning environments.

Furthermore, the Covid-19 pandemic has underscored the role of cultural tools, such as technology, in supporting teachers' learning. Online communities and social media platforms now provide avenues for educators

to connect with peers, access resources, and engage in professional learning opportunities. Active participation of educational technology officers in the CoP also facilitated new connections, enhancing support opportunities within the community.

3.8.2.4 Context

To understand the challenges and opportunities in this study we first need to look at the educational landscape in which the study is set. Opfer and Pedder (2011) describe teacher learning as a complex system involving nested systems within systems. This learning is rooted in sociocultural contexts, actors, artifacts, situations, and activities essentially context-placed or situated processes. This research study is positioned within Kerry Education and Training Board (ETB) in the south of Ireland. Education and Training Boards are the driving force of education and training in the local community, with pathways for every learner across Early Education, Community National Schools, Post primary Education, Further Education and Training, Apprenticeships and Traineeships, Youth Services, Outdoor Education Services and Community Education Services.

Kerry ETB provision statistics

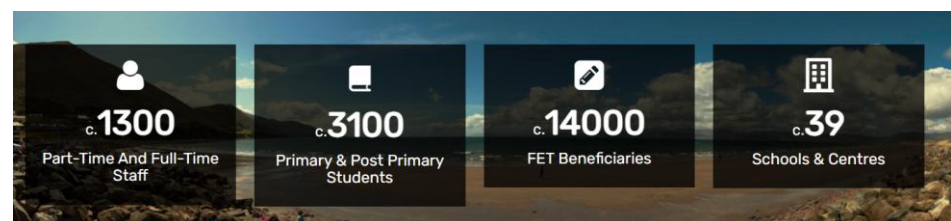


Figure 3-28 Kerry ETB provision statistics

Of the 39 schools and centres, one of the three primary schools, all eight post primary schools and eight FET centres were represented in the study which gave a true representation of all learning and teaching activities within Kerry ETB.

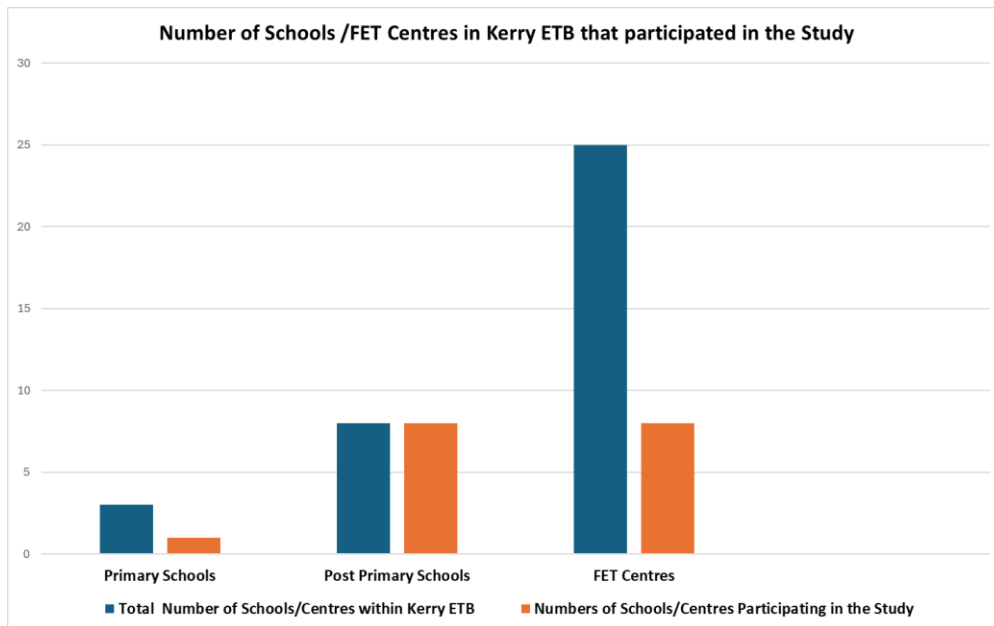


Figure 3-29 Study Participants by Kerry ETB School or Centre

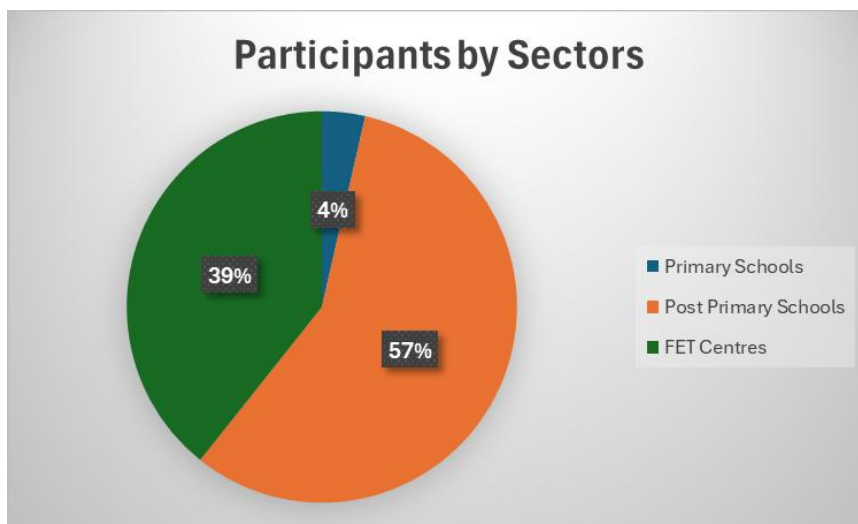


Figure 3-30 Study Participants by Sector within Kerry ETB

3.8.2.5 Purpose

The purpose of the CoP was to build a sense of community and to build capacity among the participants to design and develop a UDL implementation project for their educational setting through the sharing of knowledge and expertise among the group.

3.8.3 Evaluating and Sustaining

3.8.3.1 Benefits of Applying the C4P Framework:

There are a number of benefits to applying the C4P framework to educators CoPs:

- Increased knowledge sharing and collaboration.
- Improved professional development.
- Enhanced job satisfaction
- Greater student achievement

By applying the C4P framework, the author sought to create a CoP that was effective in supporting the participants to develop and implement UDL in their learning and teaching environments.

Below is the weekly format for the CoP

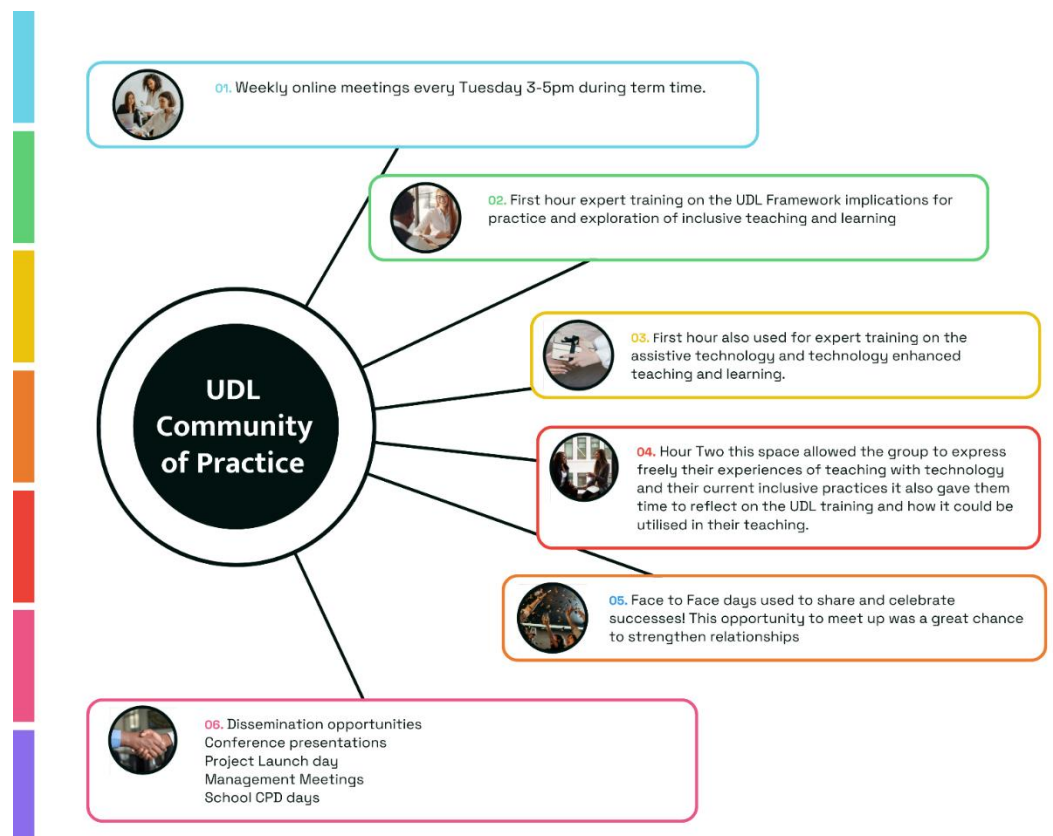


Figure 3-31 UDL Community of Practice weekly format

Wenger et al. (2002) argue for the importance of designing communities of practice (CoPs) that are dynamic and alive, fostering the inherent direction, character, and energy of the community. This study's CoP design aimed to embody these principles by integrating a framework that allowed for the natural evolution and vibrant interaction essential to effective PD and learning.

The design of the CoP space in this study was carefully crafted to facilitate open dialogue and collaborative learning among participants. By leveraging Microsoft Teams supplemented by OneNote, the platform ensured continuous accessibility to resources and facilitated synchronous and asynchronous communication. This technological infrastructure not only supported the diverse needs of participants but also aligned with the principles UDL, emphasising multiple means of engagement, representation, and action and expression (CAST, 2018).

Central to the CoP's success was its ability to foster relationships and trust among participants across different educational sectors within the Educational Training Board (ETB). Through regular meetings and structured breakout sessions, educators engaged in reflexive practices, sharing insights on integrating UDL principles into their teaching practices. This collaborative approach not only enriched their professional development but also promoted a culture of continuous improvement in educational outcomes.

The study's facilitative approach, inspired by Vygotsky's social constructivist theory, positioned the author as a co-creator of knowledge alongside participants. This method encouraged dialogue and exchange of ideas, allowing educators to explore and refine their understanding of UDL through practical application in diverse learning environments. Such participatory learning experiences are crucial as they align with Dewey's concept of discovery learning, where individuals develop insights and practices through active engagement and reflection (Dewey, 1986).

As the study progressed into its implementation phase, participants applied their learning from the CoP sessions in real-world educational settings. This phase aimed to assess the impact of cross-sectoral collaboration on the effective implementation of UDL, with weekly meetings serving as platforms for sharing challenges, successes, and strategies. This ongoing dialogue and collaboration were essential in refining the UDL implementation model, ensuring its relevance and effectiveness across primary, post-primary, and further education sectors within Kerry ETB.

The design and implementation of the CoP in this study demonstrates how effective professional development can leverage technology and collaborative

learning to enhance teaching practices and educational outcomes. By embracing principles of UDL and fostering a supportive learning community, educators were empowered to innovate and adapt their practices to meet the diverse needs of all students.

3.8.4 Targeted Professional Development

Professional development opportunities are a cornerstone for educators to learn new and effective practices, ultimately improving their classroom instruction (Fixsen et al., 2009). Discourses surrounding teacher evaluation and professional development frequently prioritise immediate action ("doing teaching") over critical reflection and articulation of pedagogical reasoning ("unpacking"). This emphasis on pragmatic application can limit the development of a robust theoretical foundation for teachers' practice (Loughran, 2019). Cochran-Smith and Lytle (1999) introduced the idea that educators experience, and are influenced by, knowledge for practice, knowledge in practice and knowledge of practice.

Vygotsky's Zone of Proximal Development (ZPD) serves as a fundamental framework in shaping the PD research design, underpinning the notion that "good learning is that which is in advance of development" (Vygotsky & Cole, 1978, p. 89). Educators typically undergo comprehensive teacher education programs focusing on traditional pedagogies followed by short professional development courses accessed on a need or interest basis throughout their careers however Fixsen (2005) argues that one-day PD sessions often fail to impact practices or foster sustained change. This understanding guided the decision to structure the study over two years to support participants to engage with new ideas and explore different approaches. Vygotsky posits that learning oriented solely towards already attained developmental levels hinders overall progress (Vygotsky & Cole, 1978). To achieve effective change in attitudes and understanding among experienced educators, it is necessary to provide targeted professional development opportunities. These opportunities should not only align with their existing knowledge and skills but also challenge them to expand beyond their familiar boundaries. Shifting from a focus on ability and disability and the conventional approach of retrospective differentiation to proactive planning for variability requires transforming teachers' mindsets about difference, diversity, equity, and

inclusion. This transformation in practice necessitates robust support for teachers through effective professional learning programs (Flood & Banks, 2021).

Applying the ZPD concept to this CoPs PD entailed creating environments where educators can collaborate and learn from more experienced peers, including those from different sectors within the Kerry ETB. This approach underscores the belief that, akin to students benefiting from guidance from more knowledgeable others, educators too can enhance their practices through peer interaction (Vygotsky & Cole, 1978).

3.8.5 Technology enhanced learning

Emerging from a year marked by enforced school closures due to the global pandemic, the national and international educational response necessitated a rapid pivot to online teaching. This unprecedented shift highlighted the critical role of technology in education and sparked a keen interest among participants in exploring technology-enhanced learning and teaching experiences to support the implementation of UDL within their educational environments. To address this need, the author introduced the Technological Pedagogical Content Knowledge (TPACK) framework, which Rosenberg and Koehler (2015) describe as “a way of thinking about what educators need to

know about technology.”

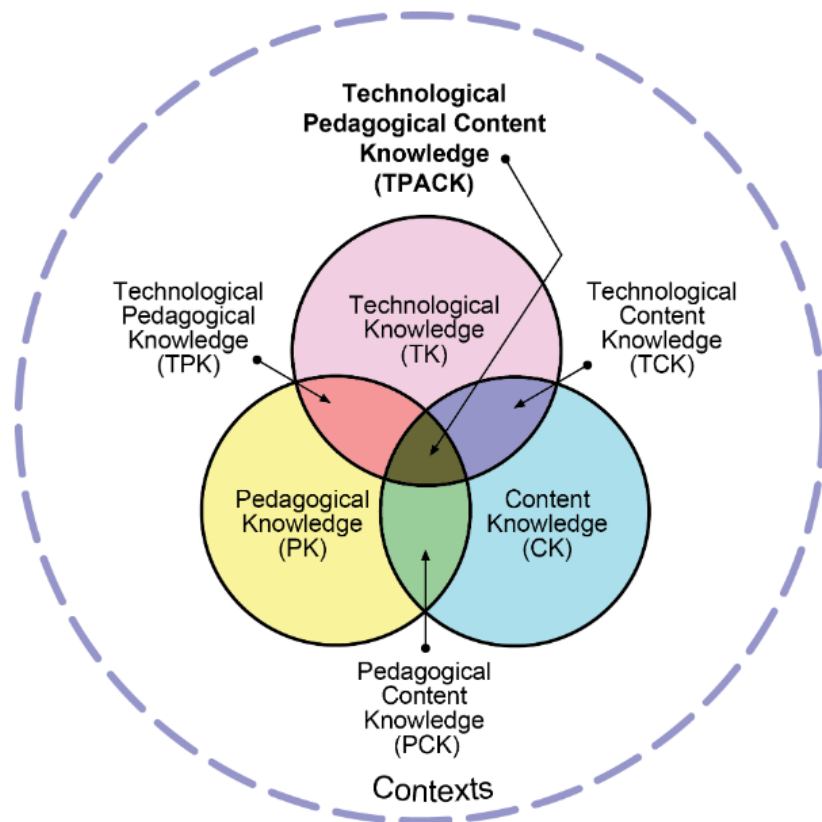


Figure 3-32 TPACK Framework

The TPACK framework emphasises the complex interplay of three primary forms of knowledge: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). Rather than viewing these domains in isolation, TPACK highlights the intersections between them, which are essential for effective teaching with technology. This includes Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and the comprehensive Technological Pedagogical Content Knowledge (TPACK).

Effective technology integration for pedagogy requires an understanding of the dynamic, transactional relationship between these knowledge components within unique educational contexts. This includes individual teacher characteristics, grade-level specifics, school dynamics, demographics, and cultural factors. As Koehler et al. (2007) argue, this sensitivity to context is crucial, as no single combination of content, technology, and pedagogy will apply universally to every teacher, course, or educational scenario. An

essential element of this professional development was the extensive input from the Educational Technology Officer, who possessed in-depth knowledge of the individual schools and centres, their technological infrastructure, staff skills, training needs, and demographic profiles. This expertise enabled the provision of institution-specific guidance and support, facilitating the seamless integration of UDL principles with the available technology. This approach aligns with the assertion by Darling-Hammond et al. (2009) that effective professional development should be contextually relevant and tailored to the specific needs of educators. By leveraging the TPACK framework, the study not only provided a robust theoretical foundation but also ensured practical applicability, thereby enhancing the capacity of educators to implement UDL effectively in their teaching practices.

Furthermore, the collaborative nature of the professional development sessions fostered a community of practice where participants could share insights, experiences, and best practices. As Wenger et al. (2002) suggest, such communities are vital for sustaining professional growth and fostering innovation. The use of Microsoft Teams facilitated these interactions, providing a platform for synchronous and asynchronous communication, resource sharing, and collaborative problem-solving.

By integrating the TPACK framework and leveraging the expertise of the Educational Technology Officer, the study created a comprehensive and contextually relevant professional development experience.

3.8.5.1 Challenges and Considerations

While the involvement of educators as researchers in DBR studies brings numerous benefits, it is essential to acknowledge and address potential challenges. Time constraints, varying levels of research expertise, and institutional barriers may impact the extent of teachers' engagement in the research process (Anderson & Shattuck, 2012). Researchers must adopt strategies to mitigate these challenges, such as providing adequate professional development opportunities, fostering a supportive research culture, and addressing institutional constraints (Design-Based Research Collective, 2003)

3.8.5.2 Evaluation and reflection

The author collected data on the impact of the innovation at key intervals throughout the two-year study, which supported the iterative design cycles and measured local impact. This evaluation process involved gathering data based on short- and long-term goals for the design solution and using this data to inform ongoing modifications and improvements in practice.

During the iterative design cycle, the researchers focused on the continual improvement of learning for the participants and the ongoing development of their UDL practices.

3.9 Conclusion

Design based research is conducted with two main goals: creating an intervention that solves problems in practice and producing theoretical understanding (McKenney & Reeves, 2019).

As an educational research methodology, it aims to bridge the gap between theory and practice by integrating the expertise of researchers and the real-world experiences of teachers. At the heart of this DBR studies lies the indispensable role of educators as research-practice partners. Henrick et al. (2017) highlighted the need to understand the strengths and types of expertise that each team member can contribute in order to capitalise on the knowledge available to the group. Collaborating with researchers, educators bring their unique insights into the complexities of classroom dynamics, student needs, and the contextual nuances of the learning environment. This collaborative design process ensures that interventions such as this study are not only theoretically grounded but also practical and relevant to the everyday experiences of educators and students (Fishman et al., 2013)

The involvement of educators in the design phase fosters a sense of ownership and commitment, enhancing the likelihood of successful implementation. Sagor (2011) says when the work is complex, when it requires an understanding of nuance and idiosyncratic behaviour and calls for constant assessment by a trained eye as well as continual adjustments in the operative theories of action, it must be informed by the insights of those taking the action: the practitioners themselves. This study explored the

significance of educators as active participants and co-researchers in a DBR study, emphasising their contributions to the development, implementation, and refinement of innovative UDL interventions that have the real potential to be upscaled and adopted by the wider educational community in Ireland.

DBR as a methodology combines rigorous research practices with the iterative development and refinement of educational interventions in real-world settings. It seeks to address complex educational problems by collaboratively designing, implementing, and studying interventions in authentic contexts (Barab & Squire, 2004). While the author recognises that the study sample is small at (n= 29) participants the participants came from a wide range of educational setting from within each sector which provides good representation of the wider education setting in Ireland. The hope is that the breath of the study offers the potential for effective generalisation of the findings and results that can be applied to the general educational population. Unlike traditional research paradigms, DBR acknowledges the dynamic nature of educational environments and the need for continuous improvement through cycles of design, implementation, and evaluation (Anderson & Shattuck, 2012).

Chapter 4 Findings

4.1 Introduction

Methodology Chapter Three in this study serves as a pivotal component, laying the groundwork for a comprehensive investigation into the impact of cross-sectoral communities of practice on supporting teachers in the Irish education system to effectively implement Universal Design for Learning (UDL). The research questions and embedded inquiries were rigorously defined, providing a robust framework for inquiry. Employing a prolonged qualitative data analysis process, the author engaged in reflexive thematic analysis to iteratively refine themes and subthemes to establish meaning and identify key findings. This method facilitated a nuanced understanding of the data, achieved through sustained engagement with qualitative tools.

The study's inception was driven by critical gaps identified in existing literature. Despite growing interest in UDL as a means to reduce barriers in education, empirical studies on its application in primary, post primary and tertiary education policies and practices are notably lacking. This dearth of primary research on UDL and its implications, as highlighted by Edyburn (2010, p. 52), underscores the need for clearer definitions and frameworks for inclusive education and UDL implementation. Within the Irish context (Reynor, 2020) further accentuated the need for enhanced support and knowledge of UDL in primary school settings, while Bray et al., (2023) also pointed to the scarcity of empirical studies in secondary education. Additionally, Healy et al., (2023) highlighted the lack of information on UDL integration into tertiary education policies and practices.

Moreover, Smith and Lowrey (2017) emphasised that UDL cannot be deemed effective if it fails to cater to all learners, underscoring the importance of inclusivity in UDL frameworks across sectors. This ambiguity surrounding UDL efficacy reinforces the necessity for empirical studies and practical guidelines to support educators in implementing UDL strategies effectively within their classrooms. Thus, the study adopts a cross-sectoral, whole-of-life approach to investigating UDL implementation, aiming to bridge the gap in literature and provide practical insights for educators.

Furthermore, concerns regarding the absence of in-service teacher PD focused on UDL implementation were raised in the literature (Smith et al., 2019). This critical gap in supporting educators in adopting UDL practices effectively led the author to incorporate targeted professional development as part of the study design. The lack of consensus in documenting UDL claims, as noted by Rao et al. (2014) calls for standardised approaches to evaluating and reporting UDL practices, a need addressed in this study by employing the UDL_IRN criteria Smith et al. (2019) in reporting participant led UDL implementations.

In this study, participants from primary, post-primary, and Further Education and Training (FET) sectors identified areas within their own practice for UDL interventions to support all students. By designing, developing, and reporting on these implementations using systematic and measurable approaches, the reader will see from the findings that participants have made considerable contributions to developing guidance at the classroom level on effective UDL implementation. These findings are poised to address concerns raised by (Edyburn & Edyburn, 2015; Ok et al., 2017; Rao et al., 2014), who underscored the necessity for guidance at the classroom level for effective UDL implementation.

This study's design integrates theoretical insights from existing literature with practical interventions aimed at addressing the identified gaps in UDL implementation. By employing a cross-sectoral, whole-of-life approach and incorporating targeted professional development, the study endeavours to contribute to the advancement of UDL practices and provide valuable guidance for educators in Ireland and beyond.

4.2 Study Themes and Subthemes

This findings chapter presents the results of a reflexive thematic analysis derived from a comprehensive examination of surveys, interviews, and participant implementation reports within the context of a design-based research study (see Chapter Three for a detailed methodological outline).

The utilisation of reflexive thematic analysis emphasises a deliberate and iterative process of data analysis, which supports the iterative nature of the

study design wherein the author has engaged deeply with the data to identify recurring patterns, emerging trends, and significant narratives. A Design Based Research study demands a more design thinking approach to data analysis. Braun and Clarke (2022) identify that reflexive thematic analysis has led some qualitative methodologists to argue that its use demands more conceptual and design thinking from researchers. By embracing reflexivity, the author critically examined their own assumptions, biases, and preconceptions, thereby enhancing the rigour and credibility of the analysis.

The triangulation of surveys, interviews, and participant implementation reports data offers a comprehensive exploration of the experiences, perspectives, and practices of the participants involved in the study. Surveys provided a broad overview of participants' demographics, attitudes, and self-reported behaviours, while interviews offered a deeper insight into the nuances of their experiences and perceptions. Participant implementation reports further enrich the analysis by offering firsthand accounts and contextualised narratives, thereby enriching the understanding of the phenomena under investigation.

Within the following sections, each thematic category and subtheme will be explored in detail, drawing upon rich empirical evidence and illustrative examples gleaned from the data. Through this in-depth exploration, the chapter seeks to illuminate the complexities inherent in cross sectoral communities of practice, the dynamics of targeted professional development initiatives, and the challenges and opportunities surrounding UDL implementation within the study context.

Overall, this chapter serves as a critical juncture in the research journey, wherein the findings of the study are synthesised, interpreted, and contextualised within the broader scholarly discourse. Through the lens of reflexive thematic analysis, the chapter endeavours to offer meaningful insights, actionable recommendations, and avenues for future inquiry, thereby contributing to the ongoing dialogue surrounding UDL Implementation in the Irish education system. Reflexive thematic analysis serves as a robust methodological framework for exploring and interpreting the multifaceted

data collected during the course of this two-year study, allowing for a nuanced understanding of the phenomena under investigation.

Through this analytical approach, this chapter examines the findings under three overarching themes:

1. Participation in a Cross Sectoral Community of Practice (CoP)
2. Targeted Professional Development (PD)
3. Universal Design for Learning (UDL) implementation.



Figure 4-1 The CoP is the core activity from which all other activities emanate

These overarching themes mirror the research questions of this thesis which include:

1. How effective is a cross sectoral (primary, post primary and further education) Universal Design for Learning (UDL) community of practice in supporting the development of a UDL implementation model?
2. To what extent does including targeted professional development as part of a cross sectoral community of practice build teacher capacity

to implement a UDL implementation model at whole school/centre level?

3. To what extent can a Universal Design for Learning (UDL) implementation model increase Irish educators ' ability to proactively support learner variability and diversity?

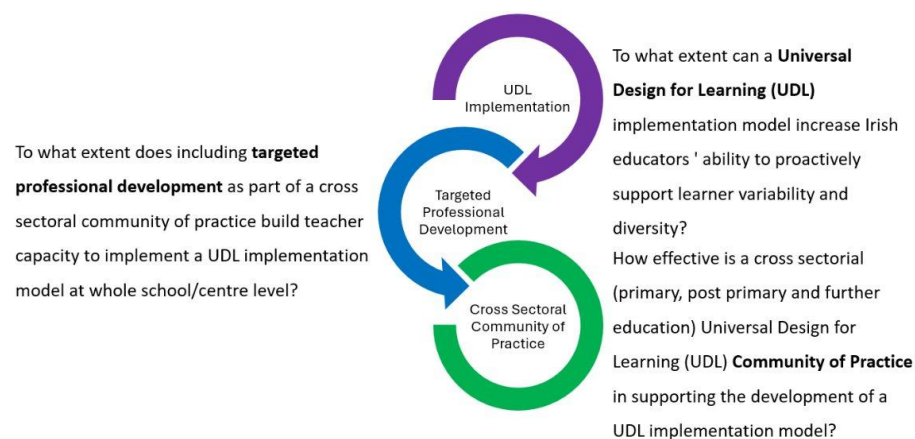


Figure 4 - 1 Research Study Questions and Themes

To support the reader the participants codes and data sources codes are listed below (see Chapter Three section 3.3 for full details on the data collection process and tools).

Participants Codes	Data Types Codes
Primary School UDLCP-1-01 Post Primary UDLCP-2-01 -UDLCP-2-17 FET UDLCP-3-01 - UDLCP-3-11	Surveys (S1) (S2) (S3) Interviews (I) Reports (R)

Table 11 Participants Unique Identifier Codes and Data Types Codes

4.2.1 Theme One: Participation in a Cross Sectoral Community of Practice

The first theme to emerge from the data analysis explores the study participants experiences within the cross-sectoral community of practice, placing particular emphasis on their interactions with individuals from diverse professional backgrounds. The inquiry revolves around the efficacy of

knowledge, expertise, and best practice exchanges concerning Universal Design for Learning and inclusive practice. Through a semantic and latent coding process applied across all data sources, distinct subthemes emerged.

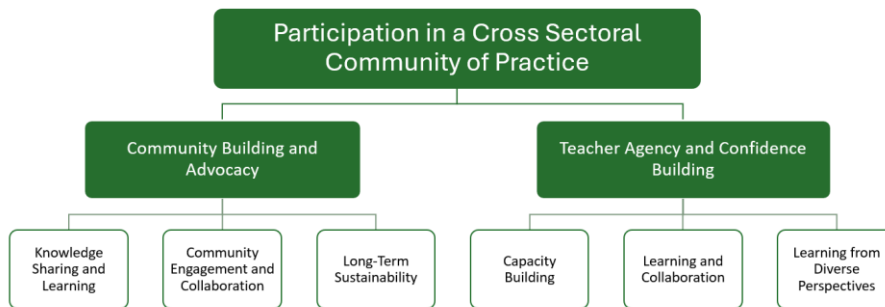


Figure 4-2 Subthemes 1.1 Community Building and Advocacy and 1.2 Teacher Agency and Confidence Building

Subtheme 1.1 Community Building and Advocacy: highlights the multifaceted nature of the participants engagement within the cross-sectoral community of practice centring on three interrelated areas: knowledge sharing and learning, community engagement and collaboration, and long-term sustainability. Knowledge sharing and learning are fundamental as they facilitate the dissemination and exchange of innovative practices and expertise, enhancing collective understanding (Wenger et al., 2002). Community engagement and collaboration are crucial for fostering a sense of belonging and mutual support among participants, which is essential for the effective functioning of CoPs (Lave & Wenger, 1991). Long-term sustainability, on the other hand, ensures that these communities continue to thrive and adapt over time, maintaining their relevance and impact in dynamic contexts (Barab & Duffy, 2012). Together, these elements of the subtheme underscore the comprehensive and dynamic nature of the participants engagement in the study CoP.

Subtheme 1.2 Teacher Agency and Confidence Building: captures the participants dedication to complex development, emphasising three primary areas: capacity building, learning and collaboration, and learning from diverse perspectives. The commitment to agency building is evident in the data as participants strived to enhance both individual and collective expertise in UDL

and inclusive practices. This dedication to professional growth emphasises the importance of continuous improvement and skill development within the community. Equally significant is the focus on learning and collaboration, where participants recognised the inherent value of collaborative learning processes (Hargreaves, 2019). They engaged in dialogue, exchanged ideas, and co-created knowledge, fostering a vibrant and interactive community of practice. Furthermore, learning from diverse perspectives emerges as a pivotal component of agency and confidence building. Participants adopted a proactive stance towards diversity, appreciating the wealth of insights, perspectives, and experiences that individuals from varied backgrounds contribute. Lefever and Ragnarsdóttir (2018) in their study found that expansive transformation can be accomplished through shared goals in inter-professional work across boundaries that call for unpacking differences and finding ways of working together. This inclusivity acted as a catalyst for innovation and growth, reinforcing the community's commitment to leveraging diversity as a strategic advantage. Collectively, these areas of interest reflect a comprehensive approach to personal and professional development, fostering an environment where continuous learning, collaboration, and diversity drive the community's progress and success.

4.2.1.1 Subtheme 1.1 Community Building and Advocacy:

Drawing on established theories of learning-as-participation (Dewey, 1916; Lave & Wenger, 1998; Schön, 2017; Vygotsky & Cole, 1978), the findings posit that the CoP served as a catalyst for community building and advocacy. The ever-shifting demands of our contemporary educational landscape necessitate continuous innovation and adaptation from educators (Kim et al., 2019). These study findings highlight that participation in a cross-sectoral educational CoP presents a multifaceted solution to meet the demands of a contemporary educational landscape, by fostering professional development and collaborative enrichment across diverse educational environments. Participants were clear about the extent to which a supportive community of practice had been created over time:

“At the start people were kind of not fully on board or not willing to give their ideas or what they were doing in the classroom, but over the two years, then that really came to the fore. Then it was, What are you doing? Actually, that will help me in my school”.

UDLCP-2-05 Post Primary (S3)

By facilitating knowledge exchange, collaborative problem-solving, and individual and professional growth, this cross-sectoral structure transcended the limitations of siloed educational practices underscoring the foundational role of community building and advocacy in fostering a thriving CoP. This aligns with literature that suggests grounded in Bandura (1969) social learning theory, communities of practice offer a sustainable model for staff-directed professional development. These communities facilitate the exchange of innovative practices, promoting the swift adoption of teaching and learning advancements and fostering opportunities for cross-institutional capacity building (Maistry, 2008; Mak & Pun, 2015). One participant described the impact of cross sectoral community of practice on their broader sense of community:

“What was really interesting, I thought at the start that it would be better to be lumped in with the people who I work in the same area as. At different times I was thrown in with other people and I started to think. Hmm, I'm probably not going to get much from this and actually it was the opposite. But I also got a lot from the other people in whether they're in secondary school, and I suppose the people working in a secondary school were further removed from what I do. They work in a very, very different way. Did they learn from me? Maybe, I did learn from them. I'd like to see the community of practice get stronger and wider”. **UDLCP-3-09 FET (I)**

Central to the field of learning sciences is the proposition that knowledge acquisition is inextricably linked to interaction and engagement within contexts infused with meaning (National Academies of Sciences, 2018). The findings highlight the extent to which learning is shared among participants from across the three sectors:

“The structure of the community of practice and the project and having teacher from all levels of the Irish education system within the Kerry ETB. Led to exchange of ideas and expansion of knowledge for all. Sharing these strategies and assessment method for each of our subject was a great advantage as this occurs especially with the long-time frame”. **UDLCP-2-03 Post Primary (S3)**

Much of these findings align with the work of Barab et al. (1999) who suggests, "learning (participation) is (re)contextualised as a participatory process involving contextualised practice and meaning, as part of an ecological system" (p. 353). Similarly, Lave & Wenger (1991) explain learning in communities of practice as something that is occurring at all times and is a condition of and an evolving form of membership. The interview data revealed a strong emphasis placed by participants on the value of cross-sectoral learning and collaboration, alongside a heightened sense of ownership within the CoP.

From the data knowledge sharing and learning emerged as a cornerstone principle of the CoP experience. Cochran-Smith and Lytle (1999) introduced the idea that teachers experience, and are influenced by, knowledge for practice, knowledge in practice and knowledge of practice.

“It was always very helpful to hear what other people are doing, what understanding they're gaining from the project. We learned so much by sharing practice between us” **UDLCP-3-01 FET (S3)**

The CoP transcended the traditional siloed professional development experiences by creating a space for the reciprocal exchange of knowledge, best practices, and pedagogical insights. Hamilton (2020) suggests that cross sectoral awareness and understanding is important as it generates empathy among teachers for policy or system constraints that impede acknowledged ‘best’ practice. Participants appeared to gain from broader understandings of the educational landscape, being part of a broader network of providers:

“Being part of this project has provided me with an opportunity to become more aware of the diverse nature of Kerry ETB in terms of the many programmes, learners and employees who are part of their teaching and learning community”. **UDLCP-3-02 FET (S2)**

This aligns with research by McArdle & Coutt (2010) who suggest that participating in a critically reflexive community fosters an awareness of professional identity and practice that remains receptive to renewal and renegotiation. The nature of the study CoP meant that participants identified the unique learning opportunities it afforded them:

“The group's experience is rich and diverse which offers each participant a unique learning opportunity”. **UDLCP-3-02 FET (S2)**

This comprehension evolves over time, aligning with the developmental pace of individuals who collectively instigate change. It amalgamates the social aspect of development with individual motivation and potential for advancement. Participants identified that even though they all had years of experience within the Kerry ETB they had a newfound appreciation and understanding of the complexities of the educational community in which they were collectively working.

“Kerry ETB's UDL Champions project provided me with an opportunity to gain a real understanding and appreciation of the many different branches to the ETB Tree of Knowledge”. **UDLCP-3-02 FET (S3)**

Within the CoP environment experienced educators could share their expertise with less experienced members, fostering a continuum of professional development but also validating their own practice experience while exploring new ideas.

“It has validated what I have been doing for the last 26 years. My way of teaching constantly evolves so I just need to

continue looking outside my comfort zone". **UDLCP-3-09 FET (S3)**

This collaborative knowledge exchange fostered a culture of collective learning, where participants recognised that their educational landscape is ever changing and that they as practitioners need to be actively involved in developing shared practice to meet the demands of the diverse classrooms. Participants have demonstrated in their answers a broadening of their understanding of the need for cross sectoral collaboration to meet the needs of their students. Building on the knowledge and expertise of colleagues within our educational communities is vital.

"As teachers we must accept that the world is changing around us, and we must continue to improve ourselves going forward to be best able to assist our students. Working collaboratively is the best strategy to achieve this as we will then possess a collective purpose in our workplace." **UDLCP-2-03 Post Primary (S3)**

Barab et al. (2002) highlights the powerful role of CoP in fostering both learning and personal transformation. Their study suggests that the interplay of shared experiences within a community, combined with opportunities for reflection and meaning making, creates a fertile environment for acquiring new knowledge and skills. This, in turn, can lead to a significant impact on participants' identities, particularly in professional contexts.

The study demonstrates that CoPs provide a platform for individuals to engage with others who share their interests and expertise. Through this interaction, participants are exposed to diverse perspectives and approaches, enriching their understanding of the subject matter. The emphasis on reflection further strengthens this learning process. By critically examining their experiences within the community, participants gain deeper insights and can refine their own practices.

Perhaps most significantly, Barab et al.'s research indicates that participation in a CoP can lead to a transformation of identities. As members learn and

grow within the community, their teaching philosophies and approaches to their work may evolve. This shift reflects a deeper integration of the knowledge, and perspectives gained through their participation in the CoP. Over time participants in this study indicated that being involved in the CoP has had an impact on their teaching philosophy.

“Collaboratively we can change our teaching philosophy, and with patience, persistence and support, we will create new champions for a better future”. **UDLCP-2-03 Post Primary (S2)**

This evolution in teaching philosophy aligns with the principles of continuous improvement and reflexive practice, essential aspects of professional development in education (Mathew et al., 2017).

4.2.1.2 Conclusion for Subtheme 1.1: Community Building and Advocacy

This study subtheme sheds light on the interrelationship between communities of practice and learning through three key findings. First, it acknowledges the inherently social nature of knowledge acquisition. Secondly building on this notion of social learning, the study recognises the symbiotic relationship between knowledge and its contextual realities. Finally, it suggests that learning extends beyond formal educational settings, encompassing interactions with peers, the development of shared meaning relevant to their practice (Kuhn et al., 1995).

4.2.1.3 Subtheme 1.2: Teacher Agency and Confidence Building

This subtheme explores the transformative potential of CoPs to foster both teacher agency and confidence in inclusive practice. At the heart of this transformation lies the capacity building function inherent within CoPs. These communities can serve as platforms for participants to systematically enhance their knowledge, skills, and expertise directly relevant to their professional roles. Active participation within a CoP has the potential to expose members to a rich tapestry of educational perspectives and pedagogical approaches. Through engagement with diverse viewpoints and learning preferences, individuals not only have opportunities to expand their knowledge base but also refine their own critical thinking and problem-solving abilities. The

collaborative nature of these communities can foster a sense of belonging and shared purpose. Bronfenbrenner's (1979) Ecological Systems Theory and Vygotsky and Cole's (1978) Sociocultural Theory were cornerstones of this study's CoP design. These theories emphasise the importance of social interaction and collaboration in learning and development which are ongoing processes influenced by interactions within various systems. This study highlights the benefit of having participants from the three educational sectors within Kerry ETB. According to Vygotsky, learning occurs through interaction with others, and knowledge is constructed within social contexts this is borne out in the findings.

Fullan (2015) also suggests that working together and engaging in lively discussions helps participants question existing practices, come up with fresh ideas, and continuously learning and improving. Participants across the sectors described the extent to which the process allowed them to re-examine their practice:

"New way of looking at how we support all student in our classes. Made me think about how we organise our learning and the challenges faced by all students". **UDLCP-2-06 Post Primary (S2)**

This reflection has led to traditionally passive learning experiences being abandoned to give way to a more empowering approach that prioritises student voice and choice (Novak, 2019).

"There's definitely an awful lot more choice and choice by student, rather than me picking the choice and my classroom environment too has definitely changed.". **UDLCP-2-05 Post Primary (S3)**

"I see huge change in the way I teach in the class classroom environment itself, the students are speaking more and I'm now speaking less, which is a huge way to the traditional form of teaching that I trained with". **UDLCP-3-10 FET (S3)**

This suggests a shift away from teacher-centred methods towards learner-centred paradigms. This shift reflects a more UDL mindset whereby integrating

UDL principles, educators acknowledge the diverse needs, preferences, and strengths students bring to the classroom, fostering inclusivity and equity (Meyer et al., 2014).

This aligns with contemporary educational frameworks of constructivism and social cognitive theory (Bandura & Walters, 1977; Piaget, 1970), which emphasise the active role of learners in constructing knowledge through engaging experiences. Furthermore, the emphasis on student voice and choice reflects the growing recognition that autonomy and self-regulation are crucial for deep learning (Deci & Ryan, 2013). As educators embrace students as partners in the learning journey, integrating UDL and student agency becomes not just a pedagogical best practice Carlisle et al. (2006), but a moral imperative for promoting educational equity and social justice (Mertens, 2007). In their answers participants from across the three sectors highlighted the importance of student agency:

“The main implication for me is to trust and follow the instincts of the children. It is important to them that they are working on something that is meaningful and enjoyable and that they can choose who they would like to work with. Even five-year-olds can tell you how best they learn, if you ask them. We don’t always ask”. **UDLCP-1-01 Primary (S1)**

“My students had a real shared sense of responsibility because I shared with them how and what I was doing and what I was learning, and they came on board, and they were very excited”. **UDLCP-2-13 Post Primary (S1)**

“But what's different about them is I'm giving more choice to the students, so they're involved in the development of the assignment. They have a voice in Assignment, they have a voice as to how they're examined”. **UDLCP-3-10 FET (I)**

4.2.1.4 Conclusion for Subtheme 1.2: Teacher Agency and Confidence Building

Participants expressed a profound transformation in their teaching practices through engaging in the cross sectoral community of practice, characterised

by a shift towards student-centred approaches and a commitment to lifelong learning and growth (Fielding, 2004).

Collectively participants demonstrated significant personal and professional growth, particularly regarding their understanding and implementation of UDL principles and inclusive practice. They identified a shared value of continuous learning and improvement in teaching practices, with a focus on creating inclusive and stimulating learning environments with students. They highlighted the acquisition of new skills and strategies to enhance teaching effectiveness and promote student inclusion. They showed heightened self-awareness and reflection on current teaching practices in alignment with the UDL philosophy. There was a clear recognition of the importance of student voice and choice Novak (2019), leading to transformative changes in instructional methods and classroom dynamics. The development of collaboration and collective efforts to prioritise student needs and empower student voice in the learning process was highly valued by participants.

4.2.2 Theme Two: Effectiveness of Targeted Professional Development

This theme examines participants experience of targeted professional development and supports within the cross sectoral community of practice. This multifaceted exploration encompasses a spectrum of activities, ranging from the refinement of pedagogical and leadership competencies to the cultivation of research insight, pedagogical expertise. It examines the rich tapestry of experiences arising from learning amidst diverse perspectives, fostering innovation. Moreover, it examines the development of practitioner led project designs, the nurturing of leadership, pedagogical and technological proficiencies to support the development of inclusive learning experience for students. Wilson and Floden (2003) suggest enhancing teacher effectiveness, in-service programs should be delivered by experienced educators. These programs should foster a collaborative environment where teachers can learn from each other by teaching and sharing experiences. The targeted PD elements in this study were delivered by the author and Kerry ETBs educational technology officer who are both very experienced practitioners with high levels of expertise in their respective fields. Vygotsky and Cole (1978) believed that learners achieve much greater understanding through the help of a more knowledgeable other.

This theme and its subthemes were identified through semantic and latent coding of all data, this analysis highlighted the multifaceted dimensions of professional growth within this vibrant professional community-based ecosystem (Fovet, 2021).

This analysis yielded two subthemes that highlight the key dimensions of this targeted professional development experience.

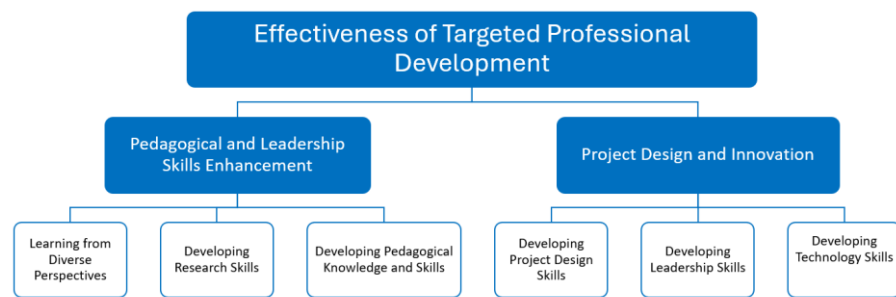


Figure 4-3 Subtheme 2.1 Pedagogical and Leadership Skills Enhancement and 2.2 Project Design and Innovation

Subtheme 2.1: Pedagogical and Leadership Skills Enhancement

This subtheme captures the multifaceted approach to professional development within the CoP. Three key areas were identified: Learning from Diverse Perspectives, Developing Research Skills, and Developing Pedagogical Knowledge and Skills. Learning from diverse perspectives is essential, as exposure to a variety of viewpoints fosters innovation and professional growth. Shevlin et al. (2013) says that it is generally accepted that inclusive practice relies to a large extent on teacher knowledge, skills, understanding, capacity and attitudes. Participants highly valued the unique perspectives and experiences brought by colleagues from different sectors, which enriched their understanding and approach to teaching (Hargreaves & Fullan, 2015). Developing research skills was another focus of the professional development program, empowering participants to critically analyse existing practices and explore new possibilities for inclusive education. This emphasis on research skills helped educators to become more reflexive and evidence-based in their practice (Ainscow, 2016). Additionally, targeted professional development activities aimed at enhancing pedagogical knowledge and skills were crucial. These activities allowed participants to refine their teaching practices and implement effective strategies to support diverse learners, ultimately leading to improved educational outcomes (Bungum & Sanne, 2021).

Subtheme 2.2: Project Design and Innovation

The second subtheme highlights the emphasis placed by participants on the development of project design skills and the innovative integration of technology within the targeted professional development supports. Three key areas are explored: Developing Project Design Skills, Developing Leadership Skills, and Developing Technology Skills. Participants honed their project design skills by learning to leverage technology to create inclusive learning experiences for students, which facilitated innovative and engaging educational practices (Laurillard, 2013). The program also nurtured leadership skills, empowering participants to champion inclusive practices within their respective contexts. This focus on leadership ensured that educators were not only proficient in using technology but also capable of driving systemic change towards inclusivity (Fullan, 2023). Additionally, the program fostered the development of technological proficiencies, equipping participants with the necessary tools to integrate technology effectively into their inclusive learning strategies. By enhancing their technological skills, educators were better prepared to meet the diverse needs of their students through adaptive and personalised learning environments.

4.2.2.1 Subtheme 2.1: Pedagogical and Leadership Skills Enhancement

Pedagogical and Leadership Skills Enhancement within targeted professional development in this study represented a strategic investment in educators' capacity to foster inclusive and effective learning environments through a UDL lens. Sokal and Katz (2017) have highlighted while attention to categories of students, such as newcomers and students with SENs, may address these students' specific learning needs, they mask recognition that there is also a great diversity of learning needs within the general population of students. This subtheme prioritises the development of pedagogical approaches grounded in UDL and personalised instruction, ensuring that participants were equipped to meet the diverse needs of all learners (Smith et al., 2019). Concurrently, it emphasises the cultivation of leadership competencies

essential for driving educational innovation and promoting collaboration among colleagues. Avalos (2011) suggests that the power of teacher co-learning emerges very strongly in PD literature. This type of exploration can only occur in a safe space where Forssten Seiser (2020) highlights the power of collaboration between facilitators and practitioners as a key space for professional growth. It demonstrates how trust-based partnerships can foster learning and empower both facilitators and practitioners. One participant acknowledged the impact of this trust-based partnerships within the CoP.

“I also felt that it was a very level playing field so like, you know, even with our facilitators and the people who were spearheading the project. That they were very honest about the fact, that they were learning from us and that we were in the classroom as well and we were bringing back valuable information to them”.

UDLCP-2-13 Post Primary (I)

The findings emphasise the importance of such relationships in driving positive change, fostering critical thinking, and ultimately leading to a more liberating approach to the field. Participants have begun to demonstrate the application of knowledge not only to their own practice but are applying a leadership approach to the application of UDL within their wider educational contexts.

“I think it has become now a part of my overall teaching philosophy and strategies. And the key for me is to encourage this as a whole school approach and empower more student voice and inclusivity.”. **UDLCP-2-03 Post Primary (I)**

“I will embed the UDL, practise more and certainly part of my responsibility will be to inform the other staff about the UDL qualification and how to formalise what we're doing”. **UDLCP-3-09 FET (I)**

“I would like to take on a similar project next year and also to encourage every teacher to implement some aspect of UDL even on a small scale”. **UDLCP-1-01 Primary (S3)**

Professional development should strike a balance between educational theory and practical application, allowing teachers to translate their learning into actionable strategies for their current classrooms (Sims et al., 2023). Participants highlighted their appreciation for the level of targeted support they received and highlighted the following as key elements which contributed to the study success. Central to the PD was the exploration of the UDL Framework which each participant mapped to their own practice which supported contextualised learning. The project's extended timeframe compared to typical PD allowed for deeper understanding and collaboration among participants and the facilitators this aligns with (Avalos, 2011; Garet et al., 2001) who say that it is clear from the literature, that prolonged PD interventions are more effective than shorter ones, and that combinations of tools for learning and reflexive experiences serve the purpose in a better way. Participants identified time as a major benefit to their learning experience:

“Yes, the main thing I think was the length of time of the project. It was longer than any other PD's I had before. So the time frame of other PD courses usually is very short, so it doesn't allow for full comprehension or expansion of the topic”. **UDLCP-2-03 Post Primary (S3)**

“I have previously completed various CPD, and I suppose this UDL project has been my best experience it was a two-year programme and usually I have completed one-year programmes and six months etcetera, etcetera. But the two-year programme gave me all the valuable tools, all the skills, all the support that I would need to implement UDL. **UDLCP-3-10 FET (S3)**

“I suppose the biggest key difference is that there was continuity in it, it wasn't just a one-day event. It wasn't just a style show of this is how you do it off you go and do it now. One year would have actually been good, but two years just

made the project so much better. **UDLCP-2-05 Post Primary (S3)**

Following the implementation of the professional development training focused on UDL, participants recognised the transformative potential of UDL in prioritising student agency and fostering inclusive practices.

To measure the effectiveness of the project, participants ranked their comprehension of Universal Design for Learning at the outset of the study and again upon completion. The ranking system used a scale of 1 (lowest understanding) to 5 (highest understanding). This resulted in a significant improvement, with participants demonstrating a 45% increase in UDL knowledge – from an average score of 46.2% to 91.2% (n=16).

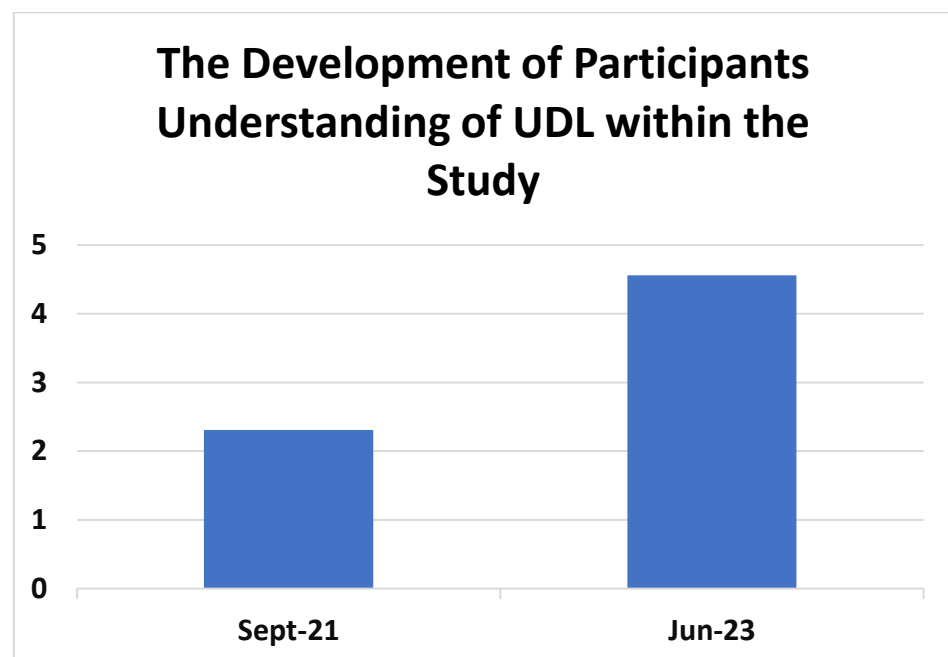


Figure 4-4 The Development of Participants Understanding of UDL within the Study

The development of participants understanding of UDL within the Study

In addition to ranking their knowledge of UDL practice, participants were asked if the project influenced their understanding of inclusive practices. A resounding 87% (n=16) agreed that their understanding benefitted from the project.

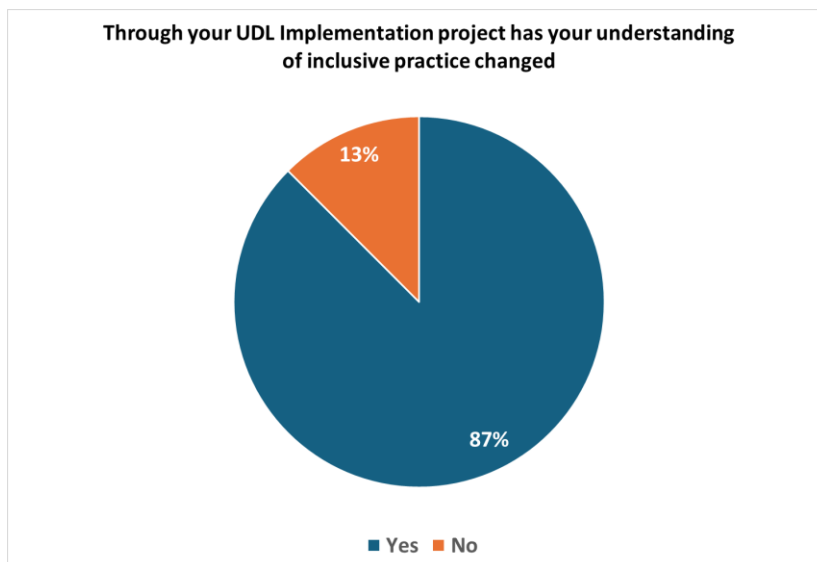


Figure 4-5 Through your UDL Implementation project has your understanding of inclusive practice changed.

This newfound understanding led participants to perceive UDL as a means to not only enhance educational outcomes but also cultivate a culture of inclusive practice as opposed to a culture of inclusion. This process encouraged participants to engage in a critical evaluation of their own pedagogical practices, differentiating between inclusion as a concept and inclusive learning and teaching as a practical framework. The participants clearly indicate their changing perspectives:

“I have also learned that differentiation as a method will be replaced by UDL and will encourage equal opportunities for all learners”. **UDLCP-3-10 Post Primary (S2)**

“I think providing a choice for all students was a key improvement in my practice as it created more inclusive environment for them to learn. This view evolved from a basic understanding of differentiation to now offering multiple means of engagement and representation to the students”.
UDLCP-2-03Post Primary (I)

“Coming from a Learning Support role, I had been influenced by differentiation which I was never really happy with as it

wasn't in my opinion inclusive. UDL is completely inclusive, and no one has to leave the classroom". **UDLCP-3-01 FET (S3)**

The findings suggest that the participants emphasis on collaborative learning and teaching underscores the transformative influence of UDL on pedagogical practices. This focus highlights UDL's potential to cultivate inclusive environments, enrich instructional approaches, and promote experiential learning. Moreover, the shift in the participants' language from teacher-centred to student-centred narratives suggests a growing prioritisation of student voice and choice Novak (2019) in designing inclusive learning experiences. This evolution signifies a move towards a more student-driven pedagogical approach with participants saying:

"Personally, I altered my teaching strategies to empower student voice.". **UDLCP-2-03 Post Primary (I)**

"I am doing a lot of this already except for the fact that I haven't consciously asked for student voice. I think that I do, informally but not in a structured way. For UDL to be successful, the student voice piece is important". **UDLCP-1-01 Primary (S2)**

"The importance of giving students choice in terms of how they access the work but also how they engage with it so they are giving the best opportunity to reach their full potential".

UDLCP-2-08 Post Primary (S2)

"Stay creative and watch for barriers in my teaching. Empower students to take ownership". **UDLCP-3-06 FET (S3)**

4.2.2.2 Conclusions for Subtheme 2.1: Pedagogical and Leadership Skills Enhancement

The study's findings suggest that the focused professional development facilitated the refinement of participants' instructional practices, a deepened

understanding of evidence-based pedagogy, and the development of their capacity to spearhead change initiatives within their respective educational settings. This integration of pedagogical and leadership skills highlights the potential of targeted professional development to empower participants as instructional leaders who advocate for excellence, equity, and continuous pedagogical improvement. Furthermore, the positive and successful nature of the professional development experience can be attributed, as the participants themselves highlighted, to its extended duration, collaborative approach, emphasis on practical application, supportive structure, and interactive learning environment.

4.2.2.3 Subtheme 2.2: Project Design and Innovation

Supporting teachers to develop project design skills and giving them the ability to be innovative with technology empowers educators to design inclusive, dynamic, and personalised learning experiences. The UDL guidelines provide a research-based instructional framework for examining the many ways that educators can implement new technology to systematically plan for and support diverse learners (McMahon & Walker, 2019). As discussed in Chapter Three, the study employed the Technological Pedagogical Content Knowledge (TPACK) Framework to develop the technology enhanced learning targeted professional development elements. Kelly (2010) emphasises the critical yet under-theorised nature of context within TPACK. To address this, the study design sought to empower participants to identify and design their own UDL technology-based interventions, acknowledging their expertise within their specific educational contexts. Participants clearly identified that taking an individualised contextualised approach to integrating technology within their UDL implementation was highly valued.

“Understanding how technology can enhance Engagement, Representation and support student Expression”. **UDLCP-2-01**

Post Primary (S2)

Work with the technological knowledge you have, be comfortable in what you are doing, we all have our own strengths. **UDLCP-2-13 Post Primary (S2)**

At the beginning of the study participants across all sectors expressed interest in technology from a teaching enhancement perspective. They talked about how they wanted to improve their knowledge and understanding to support their students' learning.

"Improve and enhance teaching and learning in the school. Learn about technology". **UDLCP-1-01 Primary (S1)**

"I hope to improve my pedagogical skills and become more aware of using ICT software packages that can make my teaching more inclusive and engaging especially for SEN students. I also want to become more confident using ICT in the classroom". **UDLCP-2-02 Post Primary (S1)**

"I want to incorporate more TEL in my classes so that my learners fully understand and excel in their work". **UDLCP-3-10 FET (S1)**

However, at the end of the study participants had moved from thinking about technology tools from a teacher's perspective to a more nuanced understanding of technology for learning. This supports Zhai et al. (2019) findings that suggest the student-led function, as opposed to teacher-led technology, grants students more agency to initiate and manipulate the technology uses in their learning for their own purposes. One participant noted:

"Give students choice in how they are learning. ICT can be a very impactful resource to help student learn when used properly".

UDLCP-2-05 Post Primary (S3)

Other participants suggested that:

"Teaching student skills not content. Organising the environment so that students can succeed". **UDLCP-2-06 Post Primary (S3)**

Increase in Self-awareness and growth; learning new IT skills". **UDLCP-3-06 FET (S2)**

4.2.2.4 Conclusions for Subtheme 2.2: Project Design and Innovation

Participants highlighted that continuity and targeted professional development within the study along with individualised support had a transformational effect on their teaching practices. Providing them with the skills to plan and execute UDL initiatives supported by technology integration.

Continuity and targeted professional development: One of the significant findings is the importance of continuity in professional development initiatives. Unlike one-off workshops or training sessions, the participants in this project experienced ongoing support and targeted professional development over a two-year period. This extended engagement allowed for deeper learning, familiarity with peers, and a greater willingness to share and adapt ideas. The consistent contact and support provided throughout the project were instrumental in facilitating their implementation project designs.

Individualised Support: The study findings highlight the critical role of individualised supports in facilitating the successful integration of technology within teaching practices. Participants highlighted the value of readily available, personalised assistance from facilitators, including one-on-one consultations. This tailored support system empowered them to identify and implement their project designs allowing them to navigate technological hurdles and refine their abilities in utilising specific tools, such as Microsoft class notebooks, more effectively. The provision of such support not only addresses the diverse needs of participants, but also aligns with the principles of UDL by providing multiple means of engagement. This emphasis on personalised support ultimately fostered participants' success in integrating technology into their teaching practices. Participants acknowledged the transformative nature of technology integration, emphasising its potential to create dynamic and personalised learning experiences that promote accessibility and equity. They envisioned technology as a tool to foster student engagement and empower them to reach their full potential. Participants recognised the ongoing nature of successful technology integration. They stressed the importance of sustained support, individualised assistance, and a willingness to adapt teaching practices. This emphasis on continuous learning suggests that an iterative process of integrating technology effectively within the educational landscape is valued by the participants.

4.2.3 Theme Three: Educators Experience of Implementing a UDL Model within their own educational context.

This theme looks at participants experience of implementing UDL within their own teaching environments. It identifies how they employed the framework within their own implementation project. It examines the impact of their participation in a cross sectoral community of practice which employed targeted professional development and its impact on their professional practice and what if any impact they felt it had on their students learning experience. Teachers' knowledge serves as the foundation on which they base decisions about their practice. Teachers need multiple types of knowledge to support their work, including content knowledge, pedagogical content knowledge, and general pedagogical knowledge (Shulman, 1986). Semantic and latent coding of all data highlighted the following subthemes:

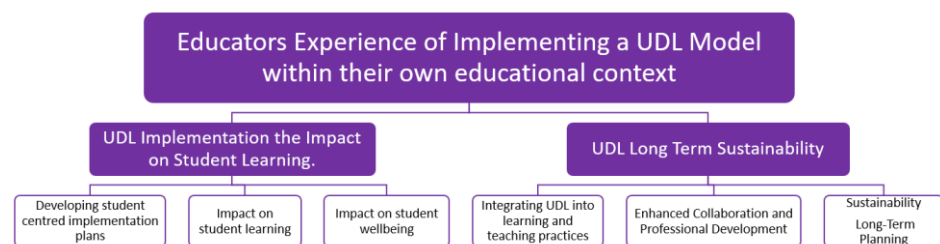


Figure 4-6 Subtheme 3.1UDL Implementation the Impact on Student Learning and 3.2 UDL Long Term Sustainability

Subtheme 3.1 The Impact of UDL Implementations on Students:

This subtheme explores how participants utilised Universal Design for Learning to create a more inclusive learning environment and its observed impact on students. Three key areas were identified: Developing Student-Centred Implementation Plans, Impact on Student Learning, and Impact on Student Wellbeing. Developing student-centred implementation plans involved participants using UDL principles to design learning experiences tailored to diverse student needs and learning preferences. By incorporating multiple means of engagement, representation, and expression, educators crafted flexible learning paths that supported varied abilities and interests (Meyer et al., 2014). The perceived impact of UDL implementation on student learning outcomes was significant, as participants observed enhanced engagement,

improved comprehension, and greater sense of academic achievement among students (Rao et al., 2014). Additionally, the impact on student well-being was notable; participants reported that UDL fostered a more supportive and inclusive classroom environment, contributing to students' emotional and social well-being. This holistic approach not only addressed academic needs but also promoted a sense of belonging and self-efficacy among learners (Katz, 2013).

Subtheme 3.2 Capacity Building and Collaborative Ecosystem:

This subtheme focuses on the role of the CoP in supporting participants' implementation of Universal Design for Learning. Three key areas were identified: Integration of UDL into Learning and Teaching Practices, Enhanced Collaboration and Professional Development, and Sustainability and Long-Term Planning. The integration of UDL into learning and teaching practices was significantly influenced by CoP participation, as teachers reported that the shared knowledge and resources within the CoP helped them incorporate UDL principles into their daily teaching strategies, leading to more inclusive and flexible classrooms (Novak, 2016). Enhanced collaboration and professional development were also notable outcomes, with the CoP providing a platform for continuous professional dialogue and mutual support, fostering a culture of collaborative learning and growth among educators (Wenger, 2011). Lastly, the sustainability and long-term planning aspect revealed that involvement in the CoP equipped participants with the necessary skills and knowledge to sustain UDL practices beyond the project's timeframe, ensuring that the inclusive teaching strategies developed were not short-lived but part of an ongoing commitment to inclusive education (McLeskey & Waldron, 2015).

4.2.3.1 Sub theme 3.1: The Impact of UDL Implementations on Students

Universal Design for Learning principles acknowledge and accept learner variability as a strength to be leveraged, not a challenge to be overcome (Rose & Meyer, 2002). UDL has the potential to go beyond removing barriers to student participation. It offers a framework for creating classrooms that actively support learning for all. UDL can also provide educators with strategies to strengthen students' executive function skills (García-Campos et al., 2020). Consequently, the curriculum should be designed with flexibility to

support these inherent differences, rather than imposing a singular approach that learners must adapt to (Hall et al., 2012). The participant's identified that the focus of their UDL implementations was predominantly on student empowerment, student well-being, student support and student voice this occurred after completing the targeted PD sessions. Participants in this research highlighted several key areas in which UDL supported inclusive practice but one in particular stood out, the impact of providing choice in learning for students:

"I think providing a choice for all students was a key improvement in my practice as it created more inclusive environment for them to learn. This view evolved from a basic understanding of differentiation to now offering multiple means of engagement and representation to the students".

UDLCP-2-03 Post Primary (I) & (R)

García-Campos et al. (2020) determined that applying UDL principles, guidelines, and checkpoints can empower students to become more self-aware learners. By experiencing diverse learning methods, students gain a deeper understanding of their learning preferences. This newfound self-knowledge allows them to adapt and refine their learning processes for greater success. This literature aligns with the findings of this study in which participants highlighted the benefits of voice and choice to students learning. One participant also argued that involving the students in the implementation process gave them a sense of agency.

"I suppose for my students, it gave them far more choice, and it felt like we were kind of on a journey together because I was learning, and they were learning.". **UDLCP-2-13 Post Primary (I) & (R)**

Findings show a positive outcome was reported by 80% of participants when asked to measure the effectiveness of their implemented UDL strategies, on students' experience. Using a scale of 1 (least successful) to 5 (most successful),

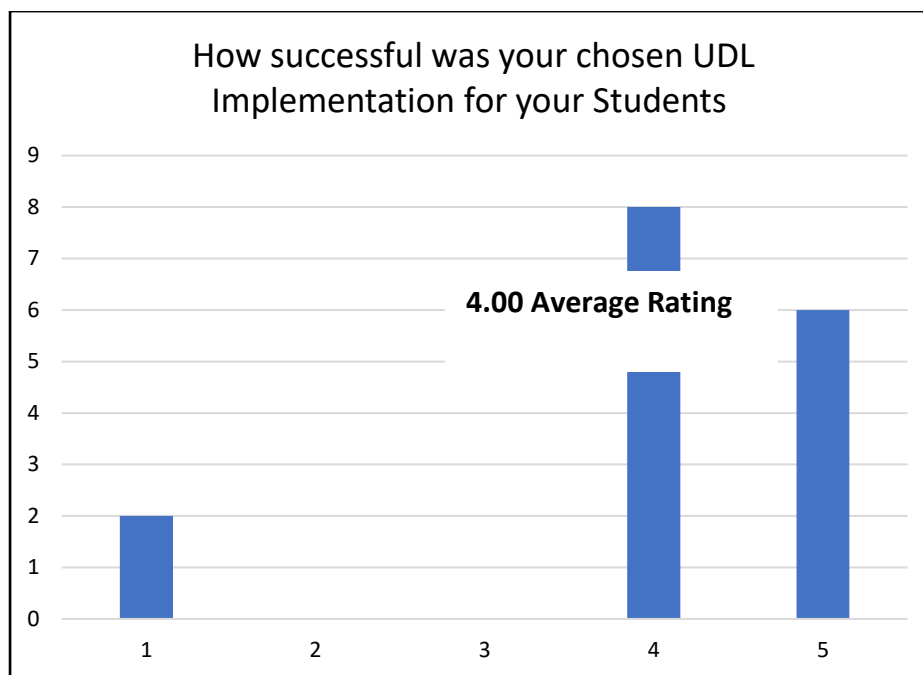


Figure 4-7 How Successful was your chosen UDL Implementation for your Students

4.2.3.2 Conclusion from Subtheme 3.1 The Impact of UDL Implementations on Students

The participants highlighted that their implementation of UDL principles led to increased student engagement, personalised learning experiences, enhanced student confidence and self-efficacy, and a heightened sense of ownership over their learning journey, which were corroborated by the positive student feedback they received. One of the key findings from the study participants was the capacity of UDL to promote individualised learning pathways for their students. This suggests that by offering multiple means of engagement, representation, and action & expression, UDL can cater to diverse learning preferences and student needs. This inherent flexibility empowered the study participants to design lessons tailored to support their individual student needs, thereby fostering a sense of agency and personalised learning experiences. Through the provision of varied types of engagement and expression, participants reported that UDL facilitated active participation in the learning process, ultimately promoting autonomy and self-directedness among their students.

4.2.4 Sub theme 3.2: UDL Long Term Sustainability

The increasing diversity within student populations necessitates ongoing engagement with contemporary, evidence-based pedagogical methodologies.

It is well recognised in education literature that engagement requires a heightened awareness of the complex needs of individual learners (Fredricks et al., 2004). The evolving classroom landscape now encompasses a vast array of abilities, cultural backgrounds, and socio-economic circumstances. Within the contemporary framework of inclusive educational settings, the development staff competence that effectively address this diversity necessitates targeted professional development initiatives. Craig et al. (2022) argues that such actions are essential for equipping educators with the requisite knowledge and competencies to effectively apply relevant methodologies and frameworks that are central to establishing comprehensive support systems for all students. The expansion and sustainability of these exemplary practices necessitate scaffolding approaches (Sailor, 2015). Significantly, participants emphasised the importance of adopting a holistic approach at the whole school/centre level toward Universal Design for Learning implementation. This emphasis underscores a commitment to systemic transformation, ensuring all stakeholders are engaged in a coordinated effort to embed UDL principles across their educational landscape. Many of the participants described systemic / organisational change. Some participants schools had begun to include UDL in school policies and were developing plans to further develop these implementations including it in the work of their teaching and learning teams:

“We are including UDL in all policies throughout our school, we will continue to do work as part of the T&L team around UDL”.

UDLCP-2-17 Post Primary (S3)

While others were at the beginning of their journey

“I would like to take on a similar project next year and also to encourage every teacher to implement some aspect of UDL even on a small scale. The idea of providing choice across all lessons is something that I can embed straight away as being aware of it is half the battle”. **UDLCP-1-01 Primary (S3)**

“To implement inclusive practices for EAL students using UDL, a whole-school approach involving stakeholders is crucial and is a

concept that I am eager to champion going forward.”. **UDLCP-2-03 Post Primary (S3) & (R)**

One participant working in the tertiary education sector described embedding UDL implementation as part of the work of their teaching and learning committee.

“Implementation via the colleges teaching and learning committee”. **UDLCP-3-06 FET (S3)**

The findings on the impact of organisational change are also mirrored in the mixed methods QUAL +quan analysis. The following statistical data provides compelling evidence of a robust commitment towards fostering a school/centre wide UDL implementation approach. The participants demonstrated leadership in cultivating UDL practices within their respective educational settings. This leadership is evidenced by their efforts in facilitating staff training, offering ongoing support for colleagues, and fostering productive engagement with school/ centre administration. Notably, the participants have transcended a focus on individual UDL implementation within their own classrooms. They have now embarked on the development of a comprehensive UDL ecosystem, aiming to seamlessly integrate UDL principles across their institution's planning and operation. This signifies a shift towards a holistic and sustainable approach to UDL adoption.

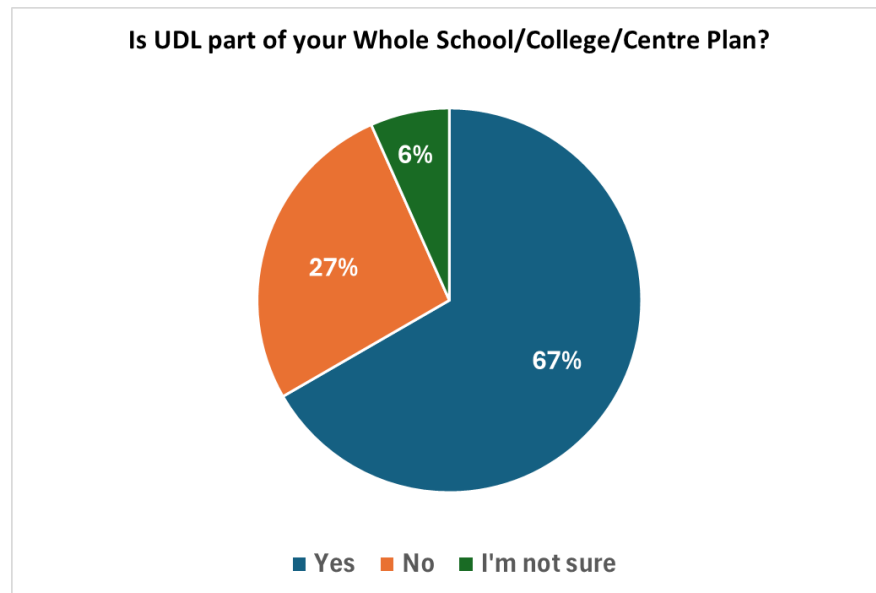


Figure 4-8 Is UDL part of your Whole School/College/Centre Plan

Notably, 67% (n=16) of participants who responded to the survey question responded that UDL was now part of their whole School/College/ Centre plan

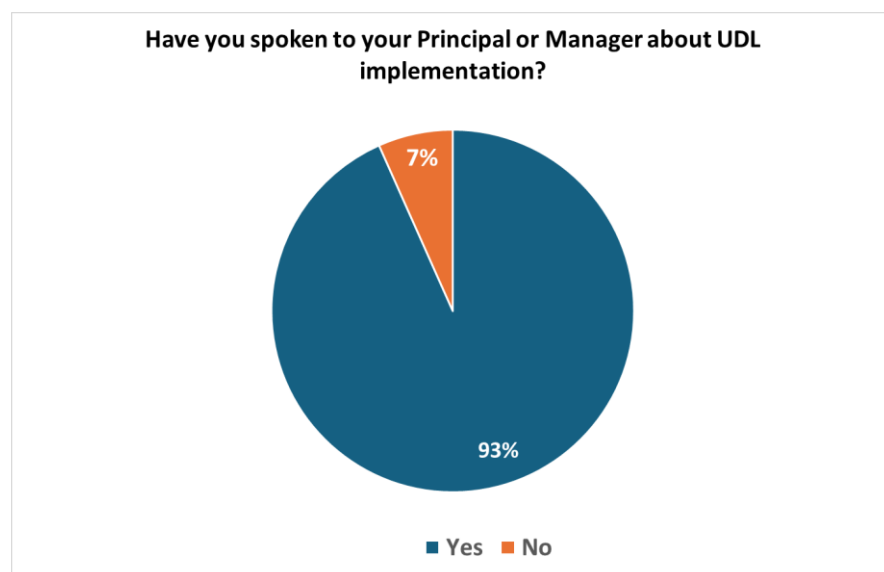


Figure 4-9 Have you spoken to your Principal or Manager about UDL Implementation.

Notably, 93% (n=16) of participants who responded to the survey question responded that they had spoken to their Principal or Manager about UDL implementation.

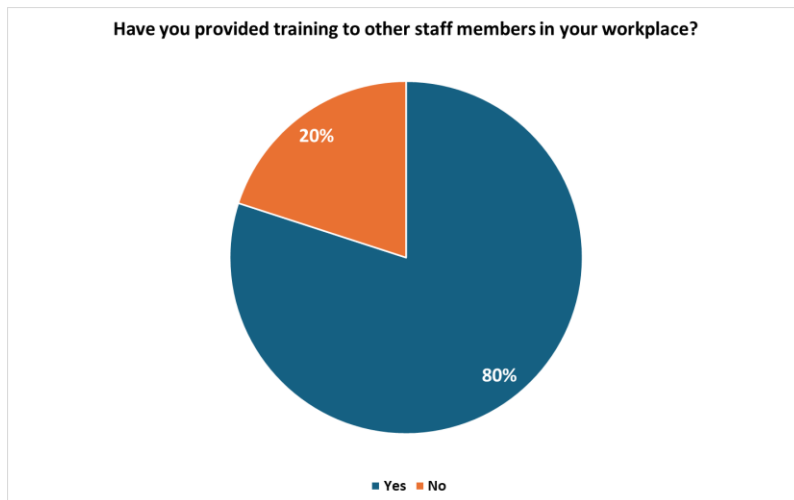


Figure 4-10 Have you provided Training to other Staff members in your Workplace?

Notably, 80% (n=16) of participants who responded to the survey question responded that they had provided training to other staff members in the workplace.

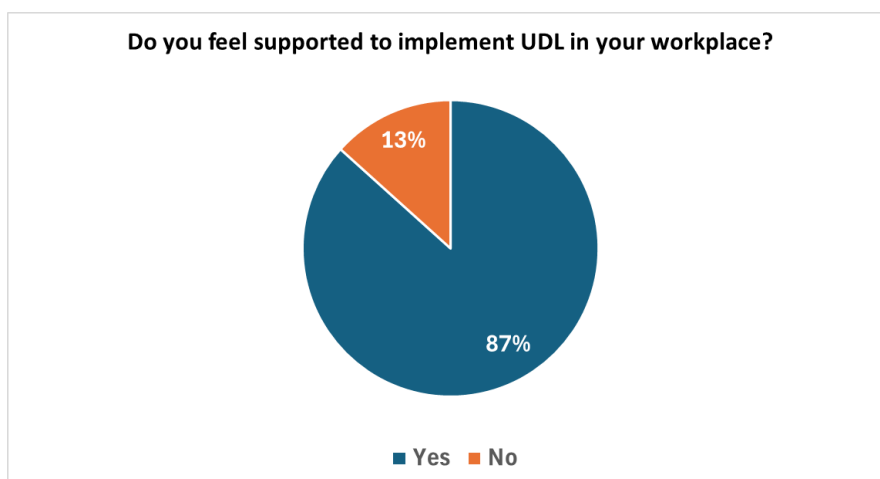


Figure 4-11 Do you feel Supported to implement UDL in your Workplace?

Notably, 87% (n=16) of participants who responded to the survey question responded that they felt supported to implement UDL in their workplace.

In order to ensure that UDL is sustainable long term within the Irish education system it was imperative that this study safeguarded that participants implementations could be systematically assessed and analysed to ensure that they could be replicated by other schools and centres. The study addressed the critical gap in Universal Design for Learning research – the lack of standardised reporting on implementation practices (Rao et al., 2014) which was address in both chapters 2 and 3.

To address this critical need, the study employed a consistent and measurable approach to UDL implementation reporting, drawing upon the UDL_IRN reporting criteria (Rao et al., 2020) (Appendix6). As the only currently available framework, this reporting criteria provided a solid foundation for participants to report on their UDL interventions. Within the UDL_IRN reporting criteria data is gathered under the following headings: Student Information, Purpose, Outcomes, Limitations, and Implications for Practice. It offered a focused and analytical structure for reporting. This structure not only fostered a more deliberate approach to UDL design within the study but also yielded valuable insights. Notably, the "Implications for Practice" section evidenced a shift in perspective. By providing participants with a reporting structure, it encouraged them to consider the broader implications, the reporting framework facilitated a move beyond classroom-level implementation thinking towards, a focus on whole-school or centre-wide UDL adoption. As evidenced by this participant, the need for managerial support is emphasised:

“I have also shared my learnings with senior management at school”. **UDLCP-2-13 Post Primary (S2)**

Also as identified by this participant was the need to embed UDL in all practice “including UDL in all subject plans” **UDLCP-2-17 Post Primary**

The level of detail and planning captured within the reports provided very clear evidence of the planning and implementation process employed by each participant. By requiring a consistent structure and specific considerations, the chosen framework ensured that participants went beyond simply describing their UDL implementation. They were prompted to analyse its impact and consider its potential for wider application. This shift in focus aligns with the ultimate goal of UDL – to create learning environments that benefit all learners, not just within individual classrooms but throughout an entire educational institution.

I would like to help lead the embedding of UDL practices in my workplace, with a focus on certain targets or strategies that can be achieved by ALL and built on going forward”. **UDLCP-3-05 FET (S3)**

It would however be unrealistic, to presume that UDL implementation occurs without challenges (Fovet, 2021; Katz, 2015). Participants highlighted the need for time, management support and technology as the three major factors in supporting UDL implementation.

“Adequate time must be assigned to teachers and students to learn how to utilize UDL principles and technology to their best advantage. This can take the form of a weekly dedicated UDL lesson”. **UDLCP-2-03 Post Primary (S3)**

The role of leadership

“Has to be support from senior management and time to give consistent and impactful learning to staff about UDL”. **UDLCP-2-05 Post Primary (S3)**

The development of expertise

“Each centre would benefit from a UDL/TEL champion who can be called upon for advice and provision of training to support UDL. Perhaps set out some goals for implementation at the beginning of the year in consultation with teaching staff”. **UDLCP-3-01 FET (S3)**

4.2.4.1 Conclusion For Subtheme 3.2 UDL Long Term Sustainability

The participants collectively emphasised the critical role of capacity building and fostering a collaborative Universal Design for Learning ecosystem in educational settings. These elements are highlighted as fundamental in promoting the effective implementation of UDL principles and in creating inclusive learning environments that cater to the diverse needs of all students.

Capacity building was highlighted as key to equipping individuals and schools\centre with the necessary skills, knowledge, and resources to effectively implement new practices or initiatives. In the context of UDL, capacity building was identified as the need to provide participants with training, support, and opportunities for professional development to enhance their understanding and implementation of UDL principles.

The responses highlighted various strategies for capacity building, including integrating UDL into school policies and subject plans, providing comprehensive training for teachers and involving as many teachers as possible in the implementation process. This clearly shows a growth mindset where the participants have moved from thinking of UDL implementation in the context of their own practice to looking at a whole school\centre approach.

The emphasis on fostering a collaborative UDL ecosystem underscores the importance of involving various stakeholders, including teachers, students, parents, and senior management, in the implementation process. Collaboration within the cross sectoral community of practice enabled the participants to share expertise, resources, and best practices, leading them to value collaboration more within their UDL implementation. They therefore actively engaged with colleagues to create supportive learning environment for all students.

An example of this is the importance given to the creating communities of practice, involving teaching, and learning committees, and appointing leaders to facilitate collaboration and knowledge sharing. It also highlights the growth in personal and professional confidence among the participants which allows them to foster collaborative initiatives that promote a culture of continuous learning and improvement, ensuring that UDL principles are integrated successfully and sustainably into school\centre practices.

This study demonstrates the critical need for standardised UDL implementation reporting. By adopting the UDL_IRN criteria and employing a focused, analytical structure, the study facilitated not only a deeper understanding of UDL's effectiveness but also a shift in the participants' perspective towards more systemic UDL implementation. This approach offers a promising model for future UDL research, allowing for a richer understanding of UDL's potential to transform learning environments

4.3 Theorising Key Findings

The emphasis participants placed on capacity building and fostering a collaborative UDL ecosystem highlights the importance of equipping educators

with the necessary skills and resources to implement UDL effectively. By involving various stakeholders, including teachers, students, parents, and senior management, educators can leverage collective expertise and resources to create inclusive learning environments that cater to the diverse needs of all students (Widianingsih and Mertens, 2019). This collaborative approach not only enhances educators' ability to proactively support learner variability but also promotes a culture of continuous learning and improvement within educational settings.

The following findings address the research questions individually under the three main identified themes:

1. Participation in a Cross Sectoral Community of Practice (CoP)
2. Targeted Professional Development (PD)
3. Universal Design for Learning (UDL) implementation

4.3.1 Research Study Question One: How effective is a cross sectoral (primary, post primary and further education) Universal Design for Learning (UDL) community of practice in supporting the development of a UDL implementation model?

Findings and analysis identified several contributions to the theory:

Knowledge Sharing and Expansion: The study supports the idea that CoPs facilitate the exchange of knowledge and ideas across different levels and sectors within an educational system. This aligns with Dewey's, (1916) concept of education as a process of "reconstruction or reorganisation of experience," (p.55) where individuals learn from each other's experiences and perspectives.

Benefits of Diverse Participation: The findings highlight the value of diverse participation within the CoP. Initial scepticism about working with colleagues from different sectoral backgrounds was overcome by the realisation that these diverse perspectives lead to richer learning opportunities. This supports Webber's, (2016) theory that bringing together a diverse group of people that share the same challenges, but have different experiences, creates a wider pool of knowledge to draw from when it comes to problem-solving.

Collaborative Learning and Peer Support: The emphasis on collaborative learning and peer support aligns with Mayne et al.'s (2015) view of CoPs as places that not only share knowledge but also generate new knowledge through collaboration. Participants learned from each other's experiences and supported each other in implementing UDL principles within their learning and teaching environments. This supports Ainscow et al.'s (2013) suggestion that schools already have much of the expertise that is needed to support the learning of all of their students, including those with disabilities and special educational needs.

Sense of Community and Collaboration: The study demonstrates that a strong sense of community can be fostered through good CoP design even within online CoPs. The observed shift from initial hesitancy to share ideas to a more collaborative environment over time highlights the importance of trust and relationship building within a CoP. This feeling of connection and support, built through shared knowledge and resources, contributed to the success of the CoP and facilitated ongoing learning which aligns with Hoadley & Kilner's, (2005) C4P framework. This is also supported by Wenger et al.'s (2002) seven principles for cultivating communities of practice. This CoP design enabled practitioners to take collective responsibility for managing knowledge creation and sharing.

Overall, the data provides evidence that Cross Sectoral Communities of Practice can be effective in promoting knowledge sharing, fostering collaboration, and ultimately improving educational practices, in this instance UDL practice. It highlights the importance of diverse participation, a strong sense of community, and trust-based collaboration within CoPs.

4.3.2 Research Study Question Two: To what extent does including targeted professional development as part of a cross sectoral community of practice build teacher capacity to implement a UDL implementation model at whole school/centre level?

Findings and analysis identified several contributions to the theory:

Extended Duration and Targeted professional development: The study's extended timeframe facilitated deeper understanding and collaboration among participants from various educational levels. Having more time allowed for meaningful exploration of ideas and advocacy for Universal Design for Learning implementation. This supports Vygotsky & Cole's (1978) Sociocultural model which emphasises the importance of collaborative learning and the role of the teacher as a facilitator of learning. The model suggests that teachers should be provided with opportunities to engage in collaborative learning activities with other teachers and with more experienced educators in order to expand their knowledge and skills. Targeted PD aligns with the findings of (Craig et al., 2022)

Group Experience: The study promoted a sense of community and shared learning, fostering open relationships between participants and facilitators. Engagement with diverse media and opportunities for discussion enhanced the learning experience.

Focus on Practical Application: The study effectively bridged theory and practice by encouraging participants to share their experiences with UDL implementation in their classrooms. This exchange of practical insights was highly valued by participants. Essential elements for teachers to gain the most effective learning through PD include (Craig et al., 2022):

- 1) content-focused training,
- 2) the incorporation of active learning,
- 3) collaboration in job-embedded context,
- 4) models and modelling of effective practices,
- 5) ongoing supports using coaching,

- 6) opportunities for feedback and reflection and
- 7) sustained duration.

Supportive Structure: Participants appreciated the well-structured study framework, including clear goals, timelines, and readily accessible online resources. Ongoing support throughout the two-year program contributed to its success. Hargreaves and Fullan (2015), found that individuals get confidence, learning, and feedback from having the right kind of people and the right kind of interactions and relationships around them.

Interactive Learning Environment: Unlike traditional professional development formats, the study offered a more interactive environment, moving beyond passive information delivery. This approach encouraged active participation and enriched learning outcomes. This aligns with Wenger et al. (2002) concept of designing for aliveness where he says that the goal of community design is to bring out the community's own internal direction, character, and energy.

4.3.3 Research Study Question Three: To what extent can a Universal Design for Learning (UDL) implementation model increase Irish educators ' ability to proactively support learner variability and diversity?

Findings and analysis identified several contributions to the theory: **Increased Engagement and Progression:** The UDL strategies led to higher levels of engagement and a sense of ownership of learning among students. By offering multiple means of engagement and providing choices in activities, students were more motivated to actively participate in their learning. This supports Rose & Meyer (2000) idea that where there is flexibility there is potential to maximise learning opportunities for all the students within today's diverse classrooms - including students with disabilities. This proactive engagement suggests that participants were better equipped to address the diverse needs and preferences of their students, thus supporting learner variability effectively.

Individualised Learning Pathways: UDL facilitates flexible pathways to learning, allowing the participants to cater to individual student needs and preferences. This approach acknowledges and supports the variability in learners' abilities, backgrounds, and learning styles, thereby proactively supporting diversity within the classroom. This aligns with McClaskey's (2016) argument that there is a significant and growing demand for learners to be able to do more than receive instruction. Learners need to develop the capacity to shape and manage their learning without over-reliance on the direction and control of others.

Increased Confidence and Self-Efficacy: Through the implementation of UDL principles, participants reported that their students became more confident in their abilities and proactive in monitoring their progress. By providing various options for learning and expression, through technology, self-directed learning and peer collaboration, participants empowered students to take ownership of their learning, thus fostering a supportive environment for diverse learners.

Positive Feedback and Enjoyment of Learning: Participants reported that their students enjoyed the learning experiences facilitated through UDL implementation, indicating that the participants were successful in creating inclusive and engaging environments. This positive feedback reflects the participants' proactive efforts in leveraging UDL principles to cater to learner variability and diversity effectively. This supports Rose & Meyer (2002) understanding of implementing the UDL framework effectively; they say by using the UDL framework educators can accept learner variability as a strength to be leveraged, not a challenge to be overcome.

Ownership and Agency in Learning: The participants empowered students to take ownership of their learning by providing opportunities for choice, exploration, and self-directed inquiry. This proactive approach aligns with the goal of supporting learner variability, as it allows students to personalise their learning experiences based on their interests and strengths. Rose and Meyer (2000) argue that the three principles of UDL can help us meet the challenges and take advantage of the opportunities inherent in the great variability of students, offering paths for those currently disenfranchised and developing the talents of all.

Reporting: This study demonstrates the critical need for standardised UDL implementation reporting. By adopting the UDL_IRN criteria and employing a focused, analytical structure, the study facilitated not only a deeper understanding of UDL's effectiveness but also a shift in the participants' perspective towards more systemic UDL implementation. This approach offers a promising model for future UDL research with a wider range of participants and contexts. Furthermore, standardised reporting can empower educators and educational institutions by providing a clear framework for UDL implementation and evaluation. This can inform professional development programs, create UDL implementation toolkits, and ultimately contribute to transforming learning environments for all learners.

4.4 Conclusion

This study investigated the effectiveness of Cross-Sectoral Communities of Practice (CoPs) with targeted professional development in promoting Universal Design for Learning implementation. The findings provide strong evidence that CoPs can be a valuable tool for educators, fostering knowledge sharing, collaboration, and ultimately improving educational practices.

The research highlights several key factors contributing to the CoP's success:

Diverse Participation: A mix of participants from different educational backgrounds and sectors led to richer learning experiences, aligning with theories on the benefits of diverse perspectives in problem-solving (Webber, 2016).

Collaborative Learning and Peer Support: The emphasis on collaboration and peer support within the CoP mirrored established frameworks for knowledge generation (Mayne et al., 2015) and supported the notion that schools possess the expertise to address student needs (Ainscow et al., 2013).

Strong Sense of Community: The CoP design (Bronfenbrenner, 1976) fostered a strong sense of community, even within an online setting (Gregory & Salmon, 2013). This sense of trust and connection, built through shared knowledge and resources, aligns with frameworks for successful CoP development (Hoadley & Kilner, 2005; Wenger et al., 2002) and empowered participants to take collective responsibility for knowledge management.

Extended Duration and Collaboration: The extended timeframe of the CoP facilitated deeper understanding and collaboration, supporting (Vygotsky & Cole, 1978) sociocultural model of learning.

Focus on Practical Application: The CoP effectively bridged theory and practice by encouraging participants to share UDL implementation experiences. This aligns with best practices for professional development (Craig et al., 2022).

Supportive Structure and Interactive Learning Environment: The targeted professional development and interactive learning environment fostered active participation and enriched learning outcomes, contrasting with

traditional passive professional development formats (Hargreaves & Fullan, 2015; Wenger et al., 2002).

UDL implementation led to:

Increased Engagement: From the perspective and observations of participants students demonstrated higher levels of engagement and ownership over their learning (Rose & Meyer, 2000).

Individualised Learning Pathways: UDL facilitated flexible learning pathways, catering to individual student needs and preferences (McClaskey, 2016).

Increased Confidence and Self-Efficacy: As reported by participants students reported increased confidence and self-efficacy in their learning.

Positive Feedback and Enjoyment of Learning: As reported by participants positive student feedback indicates the CoP's success in creating inclusive and engaging learning environments (Rose & Meyer, 2002).

Overall, this study contributes to the growing body of research on the effectiveness of CoPs in educational settings. By fostering knowledge sharing, collaboration, and a focus on practical application within a supportive and interactive learning environment, cross-sectoral CoPs can be a powerful tool for promoting UDL implementation and ultimately improving student learning outcomes.

Chapter 5 Discussion

5.1 Introduction

This study set out to investigate if educators supported through a cross sectoral Community of Practice (CoP) with targeted professional development (PD) could effectively implement a Universal Design for Learning (UDL) model in classroom practice to support the diverse needs of all students. Despite growing interest in UDL as a means to reduce barriers in education, empirical studies on its application in primary, post primary and tertiary education policies and practices are notably lacking (Bray et al., 2023; Healy et al., 2023; Reynor, 2020). This dearth of primary research on UDL and its implications, as highlighted by Edyburn (2010, p. 57), underscores the need for clearer definitions and frameworks for inclusive education and UDL implementation. Moreover, Smith and Lowrey (2017) emphasised that UDL cannot be deemed effective if it fails to cater to all learners, underscoring the importance of implementing the UDL frameworks across sectors.

This investigation was grounded in the thematic literature review presented in Chapter Two, which consistently underscored the pressing need for practical guidance at the classroom level for effective UDL implementation (Edyburn & Edyburn, 2015; Ok et al., 2017; Rao et al., 2014). Thus, the study adopted a cross-sectoral, whole-of-life approach to investigating UDL implementation, aiming to bridge the gaps in literature and provide practical insights for educators. Furthermore, concerns regarding the absence of in-service teacher professional development focused on UDL implementation were raised in the literature (Smith et al., 2019). This critical gap in supporting educators in adopting UDL practices effectively led the author to incorporate targeted professional development as part of the study design. The lack of consensus in documenting UDL claims, as noted by Rao et al. (2014) calls for standardised approaches to evaluating and reporting UDL practices, a need addressed in this study by employing the UDL_IRN criteria Smith et al. (2019) in reporting participant led UDL implementations

In this discussion chapter, the author presents an in-depth discussion of the study's findings, focusing on the three primary research themes.



These overarching themes mirror the research questions of this thesis which include:

1. How effective is a cross sectoral (primary, post primary and further education) Universal Design for Learning (UDL) community of practice in supporting the development of a UDL implementation model?
2. To what extent does including targeted professional development as part of a cross sectoral community of practice build teacher capacity to implement a UDL implementation model at whole school/centre level?
3. To what extent can a Universal Design for Learning (UDL) implementation model increase Irish educators ' ability to proactively support learner variability and diversity?

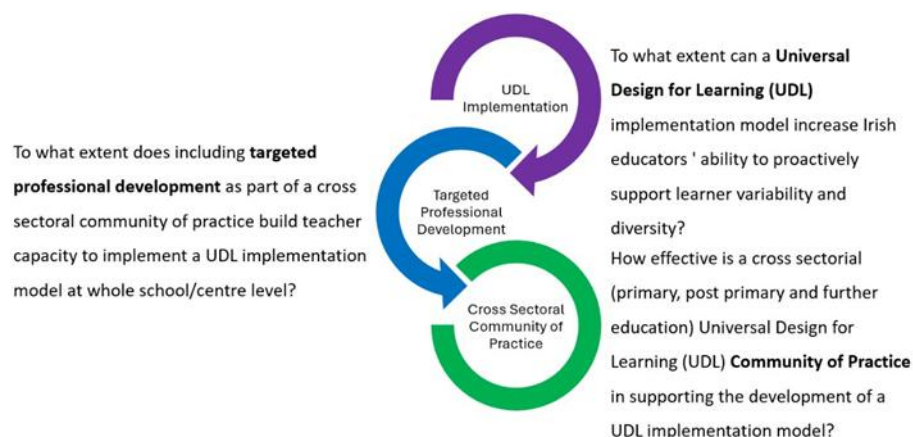


Figure 5-1 Research Themes aligned with the Research Questions

By examining the findings in Chapter Four in relation to existing literature in Chapter Two, theoretical frameworks and the methodology employed, this discussion aims to interpret the significance of the results, contextualise them within the broader academic discourse, and evaluate the implications for practice and future research. The discussion chapter will support the development of the final conclusion and recommendations Chapter which will synthesises the overall contributions of the study to theory and literature in the field of UDL and inclusive practice.

5.2 Findings from the Thematic Literature Review

The thematic literature review identified several key areas where existing research is lacking, these findings informed the authors decisions in relation to the study design and methodology and also guided them in the research question design by emphasising areas that warranted further investigation. Despite the promise of UDL in enhancing educational experiences by making learning accessible to all students, significant gaps remain regarding its implementation, efficacy, and impact across various educational settings (Rao et al., 2014). The literature review highlighted seven critical factors contributing to these gaps: (a) the lack of guidance for classroom implementation, (b) the understudied role of teachers in UDL implementation, (c) insufficient teacher professional development on UDL, (d) limited research on UDL in primary and post-primary education, (e) the limited integration of UDL in tertiary education policies, (f) a lack of consensus and documentation on UDL interventions, and (g) ambiguity in defining inclusive education and

UDL. Each of these findings will be discussed in this chapter in relation to the literature and the study findings.

5.2.1 Implications of Literature findings for the study Methodology

The findings from Chapter Two underscored the necessity for a structured approach to UDL implementation. Having identified the gaps in the literature the author in Chapter Three chose a Design Based Research (DBR) methodology to support participants to bridge those gaps. It was the need for practical guidance and support for educators in implementing UDL strategies that led the author to employ Design-Based Research (DBR) as the research methodology in this study. Brown (1992) argues that if researchers believe that context matters in terms of learning and cognition, research paradigms that simply examine these processes as isolated variables within laboratory or other impoverished contexts of participation will necessarily lead to an incomplete understanding of their relevance in more naturalistic settings. At the core of DBR's efficacy and coherence is its emphasis on generating knowledge forms that go beyond positivistic truth claims. Instead, DBR prioritises the identification of patterns, heuristics, and tentative generalisations. This approach to inquiry may diverge from conventional positivist science or ethnographic methods and instead align more closely with pragmatic lines of inquiry, where theories are evaluated not based on their claims to absolute truth, but on their effectiveness in practical application Dewey (1938) suggests that the pursuit of knowledge is inherently linked to its actionable potential. DBR constitutes a methodological framework conceived by and for educators. Its core objective lies in enhancing the influence, dissemination, and application of educational research findings to cultivate improved pedagogical practices. Additionally, DBR underscores the significance of theory construction and the development of design principles. These principles serve to guide, inform, and refine both educational practice and research endeavours within specific educational contexts (Anderson & Shattuck, 2012). The literature highlighted that UDL is under researched across all educational sectors (Bray et al., 2023; Healy et al., 2023; Reynor, 2020). Moreover, Smith and Lowrey (2017) emphasise that UDL cannot be deemed effective if it fails to cater to all learners, underscoring the importance of inclusivity in UDL frameworks across sectors. The ambiguity

surrounding UDL efficacy highlights the need for empirical studies and practical guidelines to support educators in implementing UDL strategies. Therefore, this study adopted a cross-sectoral, whole-of-life approach to investigate UDL implementation, aiming to bridge the literature gap and provide practical insights for educators. Choosing to position the study within an Irish Education and Training Board the author had access to participants from primary, post-primary and Further Education FET thus transcending the limitations of an otherwise siloed education system. Lave and Wenger (1991, p. 15) say that learning is a process that takes place in a participation framework; learning is distributed among co-participants. Anderson and Shattuck (2012) emphasise DBR's capacity to actively engage participants in the research process, contrasting with traditional methods that often treat participants solely as research subjects. This approach addressed the need to support the participants to engage in research within their own practice. DBR in the sphere of education involves a dynamic interplay of theory and practice, where educators engage in iterative cycles of designing, implementing, and refining interventions to address complex educational challenges. The overall study design was underpinned by the principles of UDL multiple means of engagement, representation and action and expression having a methodology that directly involved participant in the design allowed them to acquire expert learner skills which in turn allowed them to design and develop their own practice based UDL implementation. Cochran-Smith and Lytle (1999) proposed the idea that teachers experience, and are influenced by, knowledge for practice, knowledge in practice and knowledge of practice. When designing the data collection and analysis process for this study the author recognised that a DBR study demands a more design thinking approach to data analysis. Braun and Clarke (2022) identify that reflexive thematic analysis has led some qualitative methodologists to argue that its use demands more conceptual and design thinking from researchers. The research questions and embedded inquiries were rigorously defined, providing a robust framework for inquiry. Employing a prolonged qualitative data analysis process, the author engaged in reflexive thematic analysis to iteratively refine themes and subthemes to establish meaning and identify key findings. This method facilitated a nuanced understanding of the data, achieved through sustained engagement with

qualitative tools. The triangulation of surveys, interviews, and participant implementation report data offered a comprehensive exploration of the experiences, perspectives, and practices of the participants involved in the study. Surveys provided a broad overview of participants' demographics, attitudes, and self-reported behaviours, while interviews offered a deeper insight into the nuances of their experiences and perceptions. Participant implementation reports further enrich the analysis by offering firsthand accounts and contextualised narratives, thereby enriching the understanding of the phenomena under investigation. Participants expressed a profound transformation in their teaching practices through engaging in the cross sectoral community of practice, characterised by a shift towards student-centred approaches and a commitment to lifelong learning and growth.

5.3 Key Study Findings

The study findings highlighted six key areas of impact, (a) Community Building and Advocacy, (b) Teacher Agency and Confidence Building, (c) Pedagogical and Leadership Skills Enhancement, (d) Project Design and Innovation, (e) UDL Implementation the Impact on Student Learning and (f) UDL Long Term Sustainability.

Comparing and contrasting these findings with existing literature enriches our understanding of the study's possible contributions to theory and practice and situates it within the broader discourse on UDL implementation and teacher professional development.

5.3.1 Community Building and Advocacy

Cross-Sectoral Communities of Practice (CoPs) offer significant benefits that transcend individual schools or educational settings. García-Martínez et al. (2021) found that teacher collaboration is key to school improvement, having positive effects on social and professional capital. By establishing CoPs that connect educators across various educational sectors, there is potential to create a unified learning and development culture within a broader educational network. This aligns with the argument made by Burbank and Kauchak (2003) that collaborative networks enable educators to leverage the collective expertise of a wider community, thereby maximising the impact of professional development initiatives. For instance, participants in the study reported gaining a comprehensive understanding and appreciation of the various branches within the ETB system. The data corroborates Molla and Nolan (2020) findings that professional dispositions are context-specific, shaped through socialisation and lived experiences. Participants highlighted how engaging with colleagues from different sectors enhanced their understanding of diverse educational contexts. Hamilton (2020) emphasises that cross-sectoral awareness fosters empathy among teachers, helping them understand the policy and systemic constraints that may hinder best practices. This was evident in the study, where participants expressed increased empathy and collaborative problem-solving skills when engaging with colleagues from different educational sectors. Rouse (2008) underscores the importance of environments that encourage experimentation with diverse

teaching strategies, enhancing teachers' self-belief and agency. This study found that CoPs provide these environments, allowing educators to experiment with and share innovative teaching methods. These communities serve as platforms for participants to systematically enhance their knowledge, skills, and expertise directly relevant to their professional roles. The cross-sectoral framework of this CoP has the potential to overcome the constraints of isolated educational practices, highlighting the essential role of community building and advocacy in cultivating a successful knowledge building and exchange thus supporting teacher agency to further develop inclusive practices. Grounded in the social learning theory of Bandura (1969), CoPs offer a sustainable model for self-directed professional development. These communities facilitate the exchange of innovative practices, promoting the swift adoption of teaching and learning advancements and fostering opportunities for cross-institutional capacity building (Maistry, 2008; Mak & Pun, 2015). Eteläpelto et al. (2013) suggest that agency is always exercised and manifested within certain socio-cultural and material constraints and resources. The data revealed that active participation within a CoP exposes members to a rich tapestry of educational perspectives and pedagogical approaches. Through engagement with diverse viewpoints and learning preferences, individuals not only had opportunities to expand their knowledge base but also refine their own critical thinking and problem-solving abilities. The collaborative nature of these communities can foster a sense of belonging and shared purpose. Bronfenbrenner (1979) Ecological Systems Theory and Vygotsky and Cole (1978) Sociocultural Theory were foundational to the design of this study's CoP. These theories emphasise the importance of social interaction and collaboration in learning, processes that are continuously influenced by interactions within various systems. The study's findings demonstrate that participants from diverse educational sectors within the ETB benefited from these interactions, aligning with these theoretical frameworks. According to Vygotsky's theory, learning occurs through interaction with others, and knowledge is constructed within social contexts. This was borne out in the findings, where participants highlighted the benefits of having colleagues from the three educational sectors within the ETB. However, establishing a cross-sectoral CoP posed significant logistical challenges.

Identifying feasible points of access within the Irish education system was critical. The Education and Training Boards (ETB) system provided a unique opportunity to encompass all three sectors under one management structure. Although the participants did not have pre-existing relationships, they shared the experience and identity of belonging to the same organisation. This shared local knowledge of practice proved beneficial, as Cochran-Smith and Lytle (1999) emphasise the importance of "local knowledge of practice" knowledge generated by educators through collaboration and inquiry within their specific contexts. Teacher professional agency may manifest at an individual, relational, or collective level (Molla & Nolan, 2020). The CoP served as a platform for collaborative knowledge creation. Through shared experiences and critical reflection, participants were afforded opportunities to theorise and refine their practice, enabling them to foster a deeper understanding of how their work connects to the broader social, cultural, and political environment in which they teach. Drawing on established theories of learning-as-participation (Dewey, 1916; Lave & Wenger, 1991; Schön, 2017; Vygotsky & Cole, 1978), the findings posit that the CoP served as a catalyst for community building and advocacy. The data underscore the interrelationship between communities of practice and learning through three key findings: the inherently social nature of knowledge acquisition, the contextual realities of knowledge, and the extension of learning beyond formal educational settings. Building on the strategies of Kuhn et al. (1995) for knowledge acquisition, the study recognises the symbiotic relationship between knowledge and its contextual realities. Finally, the data suggests that learning extends beyond formal educational settings, encompassing interactions with peers and the development of shared meaning relevant to their practice.

5.3.2 Teacher Agency and Confidence Building

The study highlights the transformative potential of Communities of Practice (CoPs) that actively integrate targeted professional development (PD) in advancing professional learning, agency, and teacher confidence in fostering inclusive teaching practices through the framework of UDL (Schlager & Fusco, 2003). Participants highlighted the need to strike a balance between educational theory and practical application, as noted by Sims et al. (2023). This balance is essential for enabling teachers to translate theoretical learning

into actionable strategies that can be implemented in their current classroom practice. One participant emphasised, “It wasn’t just a style show of this is how you do it now off you go,” indicating the practical relevance and applicability of the targeted PD. This also aligns with Dewey’s (1938) theory that learning is not merely a passive reception of information but an active and dynamic process that occurs through experience.

The exploration of the UDL Framework was central to the PD, with participants mapping the framework to their own practices. This process of contextualised learning is critical, as it allows educators to adapt and apply theoretical constructs within the specific contexts of their classrooms. This approach aligns with the National Academies of Sciences (2018), which state that knowledge acquisition is inextricably linked to interaction and engagement within contexts infused with meaning. However, it is worth questioning whether all participants had an adequate foundational understanding of UDL prior to the PD. The findings from this study reported that participants ranked their knowledge of UDL at the start of the study as an average score of 46.2% and at the end of the study when asked they scored their knowledge to 91.2% demonstrating a 45% increase in UDL knowledge.

Participants reported a significant shift towards student-centred approaches and a commitment to a more learner-centric model that supports learners in taking ownership of their learning. Participants credited engagement in the CoP for supporting them to develop new ways to support students in their classrooms. This involved moving away from traditionally passive learning experiences towards a more empowering approach that prioritises student voice and choice which demonstrated profound personal and professional growth. This transformation was attributed to the collaborative nature of the CoP, which Fullan (2015) suggests provides a platform for educators to share knowledge, reflect on practices, and develop new strategies.

Peterson and Brietzke (1994) observed that collaborative cultures are not easy to develop, but they provide substantial and meaningful settings in which teachers develop craft knowledge, a powerful sense of efficacy, and a deep connection to fellow educators, parents, and students. The integration of the CoP in this study enhanced teacher agency, allowing educators to take

ownership of their professional development and make autonomous decisions that influence their teaching practices. This aligns with Goodson (2003), who emphasises the importance of understanding teacher agency in educational research, and Molla and Nolan (2020), who identify agency freedom as crucial for empowering teachers to enact change. However, while the study demonstrates the positive impact of CoPs on teacher agency, the extent to which these findings can be generalised warrants further investigation. The small sample size (n=29) and the specific context of the Covid-19 years 2021-2023 may limit the applicability of these results to broader educational settings.

The findings highlight the critical role of CoPs in facilitating the implementation of UDL. Participants noted the acquisition of new skills and strategies aimed at enhancing teaching effectiveness and promoting student inclusion. This is consistent with Shevlin et al. (2013), who assert that inclusive practice heavily depends on teacher knowledge, skills, and attitudes. However, the study does not address potential challenges in sustaining these practices over time. While short-term gains are evident, further research is needed to determine whether the benefits of CoPs in implementing UDL are maintained in the long term, particularly in varying educational environments with different levels of support and resources. Little (2002) suggests that while research underscores the benefits of robust collegial communities, there is a relative dearth of studies examining how these communities supply intellectual, social, and material resources for teacher learning and innovation, highlighting a gap that needs to be addressed.

The study reveals that CoPs serve as a fertile ground for collaborative learning and innovation. Mayne et al. (2015) emphasise the importance of CoPs in generating new forms of knowledge and practice, and this study supports that claim. Participants reported that the shared expertise within the CoP not only enhanced their individual teaching practices but also contributed to the overall capacity of their schools to support diverse learners. This aligns with Banerjee et al. (2017) who argue that a strong professional community where there is school spirit, a sense of collegiality and continuous learning and sharing of ideas among teachers, agreement on school mission, and better communication from school administrators regarding a central mission for the

schools can serve as a cushion that can mitigate some of the harmful effects of teacher dissatisfaction translating into lower student achievement.

This collaborative approach is echoed by Wenger (2011), who argues that CoPs enable practitioners to manage the knowledge they need, positioning them to drive educational innovation. Eteläpelto et al. (2013) also argue that professional agency is practiced when communities exert influence and make choices that affect their professional identities, suggesting that CoPs must balance collaborative effort with individual critical reflection to avoid potential pitfalls.

The study identifies a significant gap in traditional teacher PD models, particularly concerning the implementation of UDL. CoPs can offer a promising solution to this gap by including targeted, content-focused PD that includes active learning opportunities, models of effective practices, feedback, and sustained duration. This approach aligns with the findings of Craig et al. (2022), who advocate for well-designed PD programs that support teacher development. However, it is essential to critically evaluate whether CoPs alone are sufficient to address the systemic issues in PD models. Factors such as administrative support, funding, and policy frameworks play a crucial role in the effectiveness of PD initiatives and should not be overlooked. Belay et al. (2022) highlight the consistent association between professional learning communities and the cultivation of professional capital within schools, emphasising the need for CoPs to be integrated into a broader, systemic approach to PD.

Participants in the study also identified time as a major benefit to their learning experience. This finding emphasises the importance of allocating sufficient time for PD activities, enabling educators to engage deeply with the material and with each other. This aligns with Basham et al. (2020b) who says a common misperception is that UDL is a simple practice or even a strategy that can be quickly implemented to positively affect student outcomes. However, sustaining CoPs requires ongoing investment and support from educational leaders and policymakers. The study does not fully explore the potential barriers to maintaining CoPs over time, such as changes in leadership, budget constraints, and shifting educational priorities. Joyce and

Calhoun (2010) argue that investing in CoPs presents a valuable opportunity to cultivate a unified learning and development culture within the educational system, but achieving long-term sustainability necessitates addressing these systemic challenges.

5.3.3 Pedagogical and Leadership Skills Enhancement

The multifaceted exploration of UDL implementation within the CoP supported by targeted PD encompassed a spectrum of activities, ranging from the refinement of pedagogical and leadership competencies to the cultivation of research insight and pedagogical expertise. The study transcends individual PD by creating collaborative spaces for teachers to collectively identify challenges, share experiences, and explore solutions. Häkkinen et al. (2017) emphasise the importance of utilising shared language and frameworks to guide collaborative analysis and envisioning. Findings from the data indicate that participants' emphasis on collaborative learning and teaching highlights the transformative influence of UDL on pedagogical practices.

Specifically, the collaborative engagements facilitated through this study have fostered a shared professional language, which argued by Häkkinen et al. (2017) is crucial for effective collaboration. The data demonstrates that participants in this study utilised UDL guidelines to frame their discussions on lesson planning and instructional strategies, which not only enhanced their collective understanding but also led to more consistent implementation of inclusive practices across classrooms.

The CoP's focus on UDL highlights its potential to cultivate inclusive environments, enrich instructional approaches, and promote experiential learning. By aligning with the principles of UDL, the data demonstrates an increased ability to design lessons that support diverse learning needs, thereby creating more equitable learning opportunities. Study participants highlighted that they had altered their teaching strategies to empower student voice. This evolution of practice signifies a move towards a more student-driven pedagogical approach. Novak (2019) emphasises the importance of student agency in learning, asserting that when students are given a voice in their learning processes, their engagement and motivation increase. The findings corroborate this assertion, as teachers reported that

designing more flexible and responsive learning environments that cater to individual student preferences and needs led to more student agency whereby, they were teaching less, and the students were doing more.

The findings highlight the importance placed by the participants on the development of practitioner-led project designs and the nurturing of leadership, pedagogical, and technological proficiencies to support the development of inclusive learning experiences for their students. According to Wilson and Floden (2003), in-service programs delivered by experienced educators significantly enhance teacher effectiveness, a principle reflected in the study's targeted professional development supports. The data indicated that the PD equipped participants with shared theoretical frameworks and pedagogical tools, guiding their analysis, collaboration, and redesign efforts. The study nurtured critical dialogue, facilitating open discussions about challenging topics, including social justice, diversity, and inclusion. This allowed teachers to explore their own biases and envision more equitable practices, aligning with Boutte (2008) emphasis on critical pedagogy. The data highlighted the importance of fostering a collaborative environment where teachers learn from each other by teaching and sharing experiences, consistent with the educational frameworks of constructivism and social cognitive theory (Bandura & Walters, 1977; Piaget, 1970). Additionally, the study encouraged teachers to experiment with new approaches, acknowledging inherent risks and providing space for shared learning and analysis of results (Kiraly, 2014). Understanding pedagogic practices necessitates exploring the subjective meaning systems and values of teachers, as Molla and Nolan (2020) found. Embracing students as partners in the learning journey, integrating UDL and student agency, becomes not only a pedagogical best practice Carlisle et al. (2006) but a moral imperative for promoting educational equity and social justice (Mertens, 2007). Markey et al. (2023) argues that the increasing diversity within student populations necessitates ongoing engagement with contemporary, evidence-based pedagogical methodologies. Engagement requires a heightened awareness of the complex needs of individual learners (Fredricks et al., 2004). The evolving classroom landscape now encompasses a vast array of abilities, cultural backgrounds, and socio-economic circumstances. Within the contemporary

framework of inclusive educational settings, developing staff competence to effectively address this diversity necessitates targeted professional development initiatives. Craig et al. (2022) argue that such actions are essential for equipping educators with the requisite knowledge and competencies to apply relevant methodologies and frameworks effectively, central to establishing comprehensive support systems for all students. The expansion and sustainability of these exemplary practices necessitate scaffolding approaches (Sailor, 2015). The data emphasised the importance of adopting a holistic approach at the whole school or centre level toward UDL implementation. This approach underscores a commitment to systemic transformation, ensuring all stakeholders are engaged in a coordinated effort to embed UDL principles across their educational landscape. Many participants described systemic and organisational change, which aligns with UDL's emphasis on systemic support and transformation. UDL offers both learners and teachers multiple means of engagement, representation, action, and expression through the effective use of technology. Bronfenbrenner's (1979) Ecological Systems Theory aligns with UDL principles, as both emphasise considering the whole person and their environment in designing learning experiences. Norman (2013) maintains that "design is really an act of communication," underscoring the necessity of understanding the learner deeply to implement UDL effectively. Bungum and Sanne (2021) suggests that products of research projects using a DBR approach are deeply grounded in practitioners' contexts and thus are able to meet the actual needs of schools.

5.3.4 Project Design and Innovation

The study sought to address the critical gaps in Universal Design for Learning research by addressing the lack of standardised reporting on implementation practices, a gap highlighted by (Rao et al., 2014). By adopting a consistent and measurable approach to UDL implementation reporting through the UDL_IRN criteria Rao et al. (2020), the study findings demonstrate that it laid a solid foundation for the systematic examination and dissemination of UDL practices. Smith et al. (2019) underscored the necessity of identifying and disseminating effective models of UDL implementation. This study directly responded to this need by employing the UDL_IRN reporting framework, which facilitated the comprehensive documentation of UDL interventions. The

framework's structured categories Student Information, Purpose, Outcomes, Limitations, and Implications for Practice ensure a detailed and analytical approach to UDL reporting. This approach as highlighted in the findings not only aids in understanding specific UDL interventions but also in identifying patterns and best practices that can be shared across educational settings.

The study findings have the potential to advance the literature through its focus on the systemic aspects of UDL practice, particularly in the phases and components of implementation within teacher PD and preparation. By using a Design-Based Research (DBR) methodology, the study aligns with Anderson and Shattuck (2012), who emphasise the importance of iterative theory construction and practical refinement. This methodology enabled participants to integrate UDL principles into their educational practice systematically, ensuring that the principles were not only applied but also adapted to the specific contexts of their classrooms.

Smith et al. (2019) advocate the need for more action-oriented and longitudinal research in UDL to understand its long-term impacts. The study findings contribute to this call by documenting the implementation efforts of participants over two academic years, measuring the effectiveness of UDL practices, and noting the resources and challenges encountered. The detailed reporting of these factors provides valuable insights into the practical realities of UDL implementation, supporting the need for sustained and ongoing research to refine UDL strategies and measure their long-term success.

The study's findings identified that significant managerial support and dedicated time are crucial for successful UDL implementation, echoing the concerns raised by Rao et al. (2014) and Smith et al. (2019) about the effort required to prepare teachers for UDL. By providing a realistic understanding of the time and resources needed, the study highlights the necessity for comprehensive teacher preparation programs and ongoing professional development. This is an important insight for policymakers and educational leaders seeking to implement UDL on a broader scale.

One of the critical findings of the study is the impact of modelling UDL practices within the CoP. Fovet (2021) and Katz (2015) emphasise that effective UDL implementation requires seeing UDL principles modelled in

practice. The study supports this assertion by demonstrating how participants in the CoP shared their UDL practice with their peers, shared learning from real experiences, and openly discuss both successes and challenges. The findings show that this collaborative approach was essential for building confidence and agency among participants, making them more likely to adopt and sustain UDL practices in their classrooms in the future. The study findings also highlighted the critical role of capacity building in the successful implementation of UDL, aligning with the findings of Lundqvist et al. (2016) and Smith et al. (2019). Capacity building involves providing educators with the necessary training, support, and professional development opportunities to enhance their understanding and application of UDL principles. These findings align with Dewey's (1938) argument that individuals learn best when they are actively involved in exploring, experimenting, and making meaning from their experiences. By fostering a collaborative UDL ecosystem, the study underscores the importance of equipping both individuals and institutions with the skills and knowledge needed to create inclusive learning environments that cater to diverse student needs. The study findings support the UDL literature around the need for a standardised framework for reporting implementation practices, the study findings highlight the importance of systemic research and emphasises the need for capacity building and collaborative practices. The findings underscore the benefits of addressing the practical challenges of UDL implementation in supporting teachers to integrate UDL successfully into practice.

5.3.5 UDL Implementation the Impact on Student Learning.

Findings from the study hold significant potential to enhance both the theoretical framework and practical application of UDL, especially in the domains of student engagement and progression. The data demonstrated that UDL strategies developed by the study participants led to increased student engagement, with students also expressing a sense of ownership over their learning processes. Specifically, the provision of multiple means of engagement and choices in learning activities emerged as key motivators for active student participation. This finding substantiates Rose and Meyer (2000) proposition that flexibility in instructional approaches maximises learning opportunities across diverse classroom settings, inclusive of students with

disabilities. The data suggests that through proactive engagement educators were more adept at addressing diverse student needs and preferences, effectively supporting learner variability more effectively.

The data emphasises UDL's role in facilitating flexible learning pathways, enabling educators to tailor instruction to individual student needs and preferences. This observation aligns with McClaskey (2016) assertion that learners must cultivate the capacity to shape and manage their educational journeys, moving beyond passive reception of instruction. Participants, when employing the UDL_IRN criteria, expressed the perception that their UDL implementations increased student confidence and abilities to proactively self-monitor their progress, demonstrating UDL's efficacy in fostering self-regulation and metacognition.

The study identified that students welcomed UDL-facilitated learning experiences this demonstrates the participants' success in creating inclusive and engaging educational environments. This feedback from students through the UDL_IRN reporting criteria reinforces Rose and Meyer (2002) perspective that effective UDL implementation leverages learner variability as an asset rather than a challenge. The study's findings support the idea that providing opportunities for choice, exploration, and self-directed inquiry empowers students, in line with Rose and Meyer's (2000) assertion that UDL principles address both the challenges and opportunities presented by student variability. The study also found the impact of providing choice in learning, echoing García-Campos et al. (2020) who determined that UDL principles empower students to become more self-aware learners. This finding is consistent with participants' observations that voice and choice in learning enhance student engagement, confidence, and self-efficacy by allowing students to tailor their educational experiences to their interests and strengths and also aligns with (Novak, 2016).

The study also revealed that participant led UDL implementations were centred on student empowerment, well-being, support, and voice. This focus aligns with UDL's objectives of supporting learner variability through individualised learning pathways. By offering multiple means of engagement, representation, and action and expression, UDL effectively addresses diverse

learning preferences and needs. The data demonstrated that this flexibility enabled participants to design lessons that catered to individual student requirements, fostering a sense of agency and personalised learning experiences. These findings support Rose and Meyer (2002) assertion that educational barriers arise from rigid instructional methods rather than inherent learner capacities. Moreover, McClaskey (2016) advocates for a shift from passive reception of instruction to active learner engagement. The study supports this view, demonstrating that UDL principles encourage active participation and self-directed learning among students. The Lundy model (2007) of children's participation emphasises the importance of creating safe spaces for students to express their views, which UDL facilitates through its emphasis on student voice and choice. Widianingsih and Mertens (2019) found that the transformative research lens should incorporate ideas such as consciously addressing power differences with strategies that allow for the inclusion of the voices of the full range of stakeholders, including those who are most marginalised. The data found that this approach demonstrates that the students' perspectives shape educational outcomes, fostering genuine empowerment. The study positions UDL as a transformative paradigm in education, promoting inclusive practices that enhance outcomes for all learners. Drawing on Dewey's notion of learning as a continuous process of growth and development across all aspects of life, the data illustrates how UDL assists educators in proactive planning to meet students' instructional and environmental needs, thereby helping them achieve their full potential, this aligns with Alquraini and Rao (2020) findings. This proactive approach also aligns with Bali (2019) concept of UDL as a Pedagogy of Choice, addressing the mismatch between a diverse student population and a one-size-fits-all curriculum highlighted by (Capp, 2017).

Edyburn and Edyburn (2015) liken UDL to the "Goldilocks" metaphor, suggesting that educational experiences must be appropriately tailored to meet the needs of diverse learners. The study's findings resonate with McClaskey (2016) argument for empowering learners to manage their own learning, underscoring the critical role of UDL in fostering adaptable, inclusive, and engaging learning environments. By leveraging UDL principles, the data

indicates that educators can revolutionise educational practices, ensuring that all students have the opportunity to succeed and thrive.

5.3.6 UDL Long Term Sustainability

The study found that the participant led Universal Design for Learning implementation led to notable outcomes, including increased student engagement, personalised learning experiences, enhanced student confidence and self-efficacy, and a heightened sense of ownership over their learning journey. These outcomes were corroborated by the positive student feedback received by participants, reflecting the transformative potential of UDL in educational settings.

One of the key findings from the study was the participants perceptions of the significant impact UDL had on their student's engagement and personalised learning experiences. It demonstrated that by offering multiple means of engagement, representation, and action & expression, UDL can cater to diverse learning preferences and student needs. This inherent flexibility empowered participants to design lessons tailored to individual student needs, fostering a sense of agency and personalised learning experiences. Fredricks et al. (2004) emphasised that engagement requires a heightened awareness of the complex needs of individual learners, which UDL addresses effectively within the study. This approach aligns with Rose and Meyer (2002) who argue that learner variability should be seen as a strength to be leveraged, not a challenge to be overcome. Thus, the increased engagement and personalised learning experiences reported by participants reflect UDL's capacity to embrace and support learner variability.

The findings demonstrated the capacity of UDL to promote individualised learning pathways. By providing varied types of engagement and expression, UDL facilitated active participation in the learning process, promoting autonomy and self-directedness among students. This aligns with McClaskey (2016), who argues that learners need to develop the capacity to shape and manage their own learning without over-reliance on external direction. UDL's flexibility in offering multiple pathways acknowledges and supports the variability in learners' abilities, backgrounds, and learning styles, thereby proactively supporting diversity within the classroom.

Participants also reported enhanced student confidence and self-efficacy through UDL implementation. By providing various options for learning and expression, such as through technology, self-directed learning, and peer collaboration, participants empowered students to take ownership of their learning. This supports Rose and Meyer (2000), who contend that providing varied options fosters a supportive environment for diverse learners, thereby enhancing their confidence and self-efficacy. The positive feedback and enjoyment of learning experiences facilitated through UDL implementation further indicate that participants successfully created inclusive and engaging environments.

A significant emphasis from participants was the importance of adopting a holistic approach to UDL implementation at the whole-school or centre level. This commitment to systemic transformation ensures that all stakeholders are engaged in a coordinated effort to embed UDL principles across their educational settings. This systemic perspective is critical for sustaining UDL practices and is supported by Sailor (2015), who advocates for scaffolding approaches, and Craig et al. (2022), who argue that targeted professional development initiatives are essential for equipping educators with the necessary knowledge and competencies. Participants described their schools' efforts to include UDL in policies and plans, illustrating a commitment to organisational change. The quantitative data corroborate these efforts, with 67% of participants reporting that UDL was part of their whole-school plan, and 93% indicating they had discussed UDL implementation with their principal or manager.

The findings also highlighted the critical role of leadership and capacity building in UDL implementation. Participants demonstrated leadership by facilitating staff training, offering ongoing support for colleagues, and fostering productive engagement with school administration. This leadership extended beyond individual classrooms to the development of a comprehensive UDL ecosystem, aiming to integrate UDL principles across institutional planning and operation. Sutton and Shouse (2016) emphasise the transformative power of collaboration, while Louis and Marks (1998) highlight the importance of recognising teachers as professionals with valuable insights. Capacity building was identified as key to equipping individuals and schools

with the necessary skills, knowledge, and resources to effectively implement new practices or initiatives. Strategies for capacity building included integrating UDL into school policies and subject plans, providing comprehensive training for teachers, and involving as many teachers as possible in the implementation process.

To ensure the long-term sustainability of UDL within the Irish education system, the study addressed the critical gap in UDL research the lack of standardised reporting on implementation practices (Rao et al., 2014). By adopting the UDL_IRN reporting criteria Rao et al. (2020), the study provided a solid foundation for participants to systematically assess and analyse their UDL interventions. This framework encouraged participants to move beyond classroom-level implementation to a focus on whole-school or centre-wide UDL adoption. The comprehensive planning and implementation processes documented in the reports suggest that this study has the potential for wider application and scalability, providing generalisable evidence on the effectiveness of UDL standardised reporting can empower educators and institutions by providing a clear framework for UDL implementation and evaluation, informing professional development programs, and creating UDL implementation toolkits. This approach not only facilitated a deeper understanding of UDL's effectiveness but also encouraged a shift towards more systemic UDL implementation.

5.3.7 Study Limitations

This study critically examined teacher participants' experiences within a cross-sectoral CoP that integrated targeted PD, focusing specifically on its influence on teacher agency in implementing UDL. The research employed a rigorous data collection process, using multiple methods to triangulate findings, which enhanced the validity and reliability of the results. These findings addressed significant gaps in the existing literature, particularly those identified in Chapter Two, regarding the relationship between cross-sectoral CoPs, PD, and UDL implementation.

However, the study had a key methodological limitation, the absence of direct data from students. Consequently, the reported impacts of UDL implementation on students were based solely on teachers' interpretations.

Examining the student perspective could have greatly enriched the research by providing direct insights into how students experienced and perceived UDL. Incorporating student voices might have offered a more holistic understanding of UDL's effectiveness in fostering inclusive education practices.

Nevertheless, the primary focus of the study was to explore and enhance teacher agency in UDL implementation. This focus was intentional, as understanding how cross-sectoral CoPs and targeted PD influence teacher agency is foundational to achieving sustainable and effective UDL practices. Attempting to address all elements of UDL's impact within a single doctoral study could have diluted the rich, targeted findings related to teacher agency, which formed the cornerstone of this research.

Potential Impact on student participant on findings

- **Validation of Teacher Perceptions:** Student feedback might have confirmed or challenged teachers' interpretations of UDL's effectiveness. For example, while teachers may have considered certain strategies successful, students might have reported different outcomes regarding how those strategies affected their learning.
- **Identification of Unintended Outcomes:** Students might have identified unintended consequences both positive and negative that teachers did not observe. These could include nuanced insights into how UDL strategies influenced engagement, accessibility, or comprehension.
- **Rich Contextual Data:** Student perspectives could have revealed factors such as classroom dynamics, individual learning preferences, or persistent barriers, offering opportunities for refining UDL practices.
- **Enhanced Reliability:** Incorporating both teacher and student perspectives would have enhanced the study's reliability by triangulating data from diverse sources, reducing potential biases in teacher-reported outcomes.

Potential Major Changes in Results

- **Shifting Emphasis:** If students' experiences had diverged significantly from teachers' perceptions, the study might have shifted from celebrating UDL's success in promoting teacher agency to addressing implementation gaps or unforeseen challenges.
- **Refined Theoretical Contributions:** Including student data could have offered deeper insights into how CoPs and PD contribute to tangible student outcomes, enhancing the understanding of teacher-student dynamics in UDL.
- **Broader Implications:** Findings might have gained broader relevance by addressing not only teachers' experiences but also the direct impact of UDL on its primary beneficiaries the students.

Balancing the Study's Focus and Scope

While these limitations underscore the potential value of student perspectives, the study's focus on teacher agency was both deliberate and necessary. Empowering teachers is foundational for effective UDL implementation as capable and confident educators are better positioned to design and deliver inclusive learning experiences (Chardin & Novak 2020). Broadening the scope to include all aspects of UDL's impact might have compromised the depth of findings related to teacher agency. By narrowing its focus, the study provided a detailed and nuanced understanding of how CoPs and PD influenced teacher agency, addressing a critical gap in the literature.

Consequently, the findings regarding UDL's impact on students should be interpreted as reflective of the participants' perceptions and their understanding of UDL's effectiveness, rather than as direct measures of student outcomes.

Future Research Directions

To mitigate these limitations, future research could incorporate direct student feedback to offer a more comprehensive understanding of UDL's impact. Comparing these findings with studies that included or excluded student perspectives could yield valuable insights into the broader implications of UDL

and teacher agency. Addressing these areas in future work would not only contribute to the existing body of literature but also create opportunities for further investigation, enriching the academic discourse on UDL and teacher agency.

5.4 Conclusion

The study demonstrates that cross-sectoral CoPs are powerful tools for fostering professional growth, collaboration, and teacher agency across educational sectors. By bringing together educators from different backgrounds within the ETB system, the CoP facilitated the sharing of diverse perspectives, the adoption of innovative practices, and the enhancement of inclusive teaching strategies. Grounded in robust theoretical frameworks like Bronfenbrenner's Ecological Systems Theory, Vygotsky's Sociocultural Theory and Bandura's Social Cognitive Theory, the study confirms that social interaction and collaboration are essential for professional development.

The findings highlight the transformative potential of CoPs, especially in advancing understanding and implementation of the UDL framework. Through active participation in these communities, educators reported significant improvements in their confidence, agency, and ability to apply theoretical knowledge in practical classroom settings. However, the study also identifies challenges, particularly in sustaining these benefits over time and across different educational contexts. As such, while CoPs offer a promising model for professional development, their long-term success will depend on ongoing support, adequate resources, and systemic integration within broader educational frameworks.

Ultimately, the study highlights the need for a balanced approach to professional development; one that combines the collaborative strengths of CoPs with critical reflection and systemic support. By doing so, educational institutions can cultivate a unified culture of learning and development that enhances teacher efficacy and agency.

Chapter 6 Conclusion

6.1 Introduction

In this study, the author has explored the transformative potential of cross-sectoral collaboration and the implementation of Universal Design for Learning (UDL) in enhancing educational practices. Through three distinct contributions, this research advances understanding of how collaborative networks among educators and the adoption of UDL principles can significantly impact teacher agency, student engagement, and learning outcomes.

The first contribution examined the dynamics of cross-sectoral CoPs highlighting their role in fostering social and professional capital among educators. By aligning with existing theoretical frameworks and empirical evidence, this study emphasised the importance of collaborative problem-solving, empathy, and cross-sectoral awareness in improving educational practices. Furthermore, it underscored the necessity of community building and advocacy to overcome siloed educational practices, thus contributing to a more comprehensive understanding of teacher development within socio-cultural contexts.

Building upon this foundation, the second contribution examined the development of teacher agency through the implementation of UDL principles through participation in a cross sectoral CoP. By providing targeted PD support for the consistent implementation of UDL practices, this research reinforced the importance of shared language and frameworks in guiding collaborative analysis. Moreover, it addressed critical gaps in the literature regarding UDL reporting and evaluation, offering insights into the systemic support and organisational structures necessary for successful implementation. Through its emphasis on capacity building and collaborative practices, this contribution provided practical implications for educators, policymakers, and educational leaders seeking to promote inclusive practices and enhance student learning outcomes.

The third contribution focuses on the impact of UDL on student learning, particularly in terms of student engagement and progression. By

demonstrating how UDL strategies empower students and foster a sense of agency in their learning processes, this research expanded theoretical knowledge on inclusive education for all. Furthermore, it highlighted the practical implications of UDL implementation for educators, emphasising the importance of creating flexible learning pathways and promoting active learner engagement.

The following sections will synthesise these contributions and discuss their implications for future research, policy development, and educational practice.

6.2 Contribution 1: Cross-Sectoral Knowledge Sharing and Development

The exploration of Cross-Sectoral Communities of Practice (CoPs) underscores their transformative potential in enhancing both social and professional capital among educators. This study provides robust empirical evidence that teacher collaboration within CoPs enhances teacher agency and facilitates professional growth, corroborating and extending the findings of García-Martínez et al. (2021). Specifically, the data reveals that participation in CoPs leads to greater confidence in instructional strategies and increased motivation for continuous professional learning which aligns with McKenney and Reeves (2019) findings. This directly supports the theoretical frameworks of Burbank and Kauchak (2003) and Molla and Nolan (2020), which argue that professional dispositions and identities are forged through social interactions and lived experiences.

Furthermore, this research advances the discourse by demonstrating how CoPs can serve as platforms for educators to gain a profound understanding of diverse educational contexts, fostering empathy and collaborative problem-solving. This aspect of CoPs aligns with the insights of Hamilton (2020) and Rouse (2008), who emphasise the significance of cross-sectoral awareness and environments that encourage pedagogical experimentation. For instance, participants reported that interactions within the CoP enabled them to adopt innovative teaching strategies previously unconsidered. Situating these findings within Bandura's (1969) social learning theory, the study emphasises

that learning within CoPs is inherently a socially mediated process, thereby providing a robust framework for understanding teacher development.

The study's focus on community building and advocacy within CoPs addresses a critical gap in the literature regarding the siloed nature of traditional educational practices. Supporting the views of Eteläpelto et al. (2013), this study reveals that professional agency is developed within socio-cultural and material constraints. For example, participants in the CoP reported that the collective support and shared resources helped them overcome individual and school environment limitations. This finding resonates with the theories of Dewey (1916), Lave and Wenger (1991), and Vygotsky & Cole (1978), contributing to a more nuanced understanding of learning as participation.

Moreover, this study provides significant practical implications for educational policymakers and school leaders. By demonstrating the transformative potential of CoPs, it suggests that fostering such communities can strategically enhance teacher professional development.

Based on the study findings educational leaders should consider investing in the creation and maintenance of CoPs to build professional and social capital among educators, ultimately leading to improved instructional practices and student outcomes. This recommendation aligns with the notion that CoPs are essential for systematic knowledge enhancement and capacity building.

In summary, this study not only supports but also extends existing theoretical frameworks by providing empirical evidence of the benefits of CoPs. It addresses specific gaps in the literature related to siloed educational practices and emphasises the importance of socio-cultural and material contexts in exercising professional agency. By highlighting the practical implications for educational policy and practice, this research spotlights the broader impact of CoPs on teacher development and educational improvement.

6.3 Contribution Two Developing teacher agency in Universal Design for Learning (UDL) Implementation

This research makes a substantial theoretical and empirical contribution to the fields of UDL and teacher professional development by highlighting the impact of participant-led UDL implementation within the CoP framework. This study

supports Häkkinen et al.'s (2017) findings by demonstrating that the establishment of a shared language and framework within CoPs significantly enhances collaborative analysis and communication among educators. This shared understanding is crucial for the consistent implementation of UDL principles, which, in turn, enhances inclusive practices and strengthens pedagogical and leadership competencies.

The study reveals that UDL's transformative influence on teaching strategies significantly increases teacher agency, engagement, and motivation. This finding aligns with and extends constructivist and social cognitive theories (Bandura, 1977). By providing teacher reported evidence that UDL strategies such as flexible learning paths and choice in assessments lead to improvements in student autonomy and self-regulation, this study adds efficacy to the existing UDL literature on student outcomes. Addressing the gaps in UDL reporting and evaluation highlighted by Rao et al. (2014) and Smith et al. (2019), the study offers a robust foundation for the systematic examination and dissemination of UDL practices. The adoption of a Design-Based Research (DBR) methodology not only supports iterative theory construction but also practical refinement, advancing Anderson and Shattuck's (2012) Brown (1992) and McKenney and Reeves (2019) findings.

The research also highlights the critical importance of systemic and organisational support for successful UDL implementation. This insight is crucial for policymakers and educational leaders aiming to implement UDL on a broader scale, echoing the concerns raised by Rao et al. (2014) and Smith et al. (2019). The findings suggest that structured professional development, significant managerial support, and dedicated time for teachers to collaborate and plan are essential components for sustaining UDL practices. This reinforces the need for comprehensive teacher preparation programs, aligning with the arguments made by Rao et al. (2014) and Smith et al. (2019).

A pivotal finding of the study is the impact of modelling UDL practices within the CoP. Fovet (2021) and Katz (2015) emphasise that effective UDL implementation requires seeing UDL principles in action. The study supports this assertion by showing how participants in the CoP shared their UDL practices with peers, discussed real experiences, and collaboratively

addressed both successes and challenges. This collaborative approach was essential for building confidence and agency among participants, making them more likely to adopt and sustain UDL practices in their classrooms.

Moreover, the study highlights the critical role of capacity building in the successful implementation of UDL, aligning with the findings of Lundqvist et al. (2016) and Smith et al. (2019). Capacity building involves providing educators with comprehensive training and ongoing support to enhance their understanding and application of UDL principles. This aligns with Dewey's (1938) experiential learning theory, which posits that active involvement in learning processes fosters deeper understanding and practical application.

By fostering a collaborative UDL ecosystem, the study emphasises the importance of equipping both individuals and institutions with the skills and knowledge needed to create inclusive learning environments that cater to diverse student needs. The findings support the need for a standardised framework for reporting UDL implementation practices, facilitating consistent and effective application of UDL principles. Addressing practical challenges and supporting teachers through collaborative practices, this research significantly advances the field of inclusive education, promoting long-term sustainable change. Thus, the study not only fills critical gaps in the existing literature but also provides a comprehensive framework for future research and practice in UDL and teacher professional development.

6.4 Contribution Three: Impact on Student Learning

The study's findings hold significant potential to enhance both the theoretical framework and practical application of UDL, especially in the domains of student engagement and progression. The data demonstrated that UDL strategies, designed by participants, resulted in heightened levels of student engagement and an acknowledged sense of ownership over their learning processes. Specifically, the provision of multiple means of engagement and choices in learning activities emerged as key motivators for active student participation. This finding substantiates Rose and Meyer (2000) proposition that flexibility in instructional approaches maximises learning opportunities across diverse classroom settings, inclusive of students with disabilities. The data suggests that through proactive engagement educators were more adept

at addressing diverse student needs and preferences, effectively supporting learner variability more effectively.

The data emphasises UDL's role in facilitating flexible learning pathways, enabling educators to tailor instruction to individual student needs and preferences. This observation aligns with McClaskey (2016) assertion that learners must cultivate the capacity to shape and manage their educational journeys, moving beyond passive reception of instruction. Participants reported that their UDL implementations increased student confidence and abilities to proactively self-monitor their progress, demonstrating UDL's efficacy in fostering self-regulation and metacognition.

The study identified that students welcomed UDL-facilitated learning experiences this demonstrates the participants' success in creating inclusive and engaging educational environments. This feedback from students through the UDL_IRN reporting criteria reinforces Rose and Meyer (2002) perspective that effective UDL implementation leverages learner variability as an asset rather than a challenge. The study's findings support the idea that providing opportunities for choice, exploration, and self-directed inquiry empowers students, in line with Rose and Meyer's (2000) assertion that UDL principles address both the challenges and opportunities presented by student variability. The study also found the impact of providing choice in learning, echoing García-Campos et al. (2020) who determined that UDL principles empower students to become more self-aware learners. This finding is consistent with participants' observations that voice and choice in learning enhance student engagement, confidence, and self-efficacy by allowing students to tailor their educational experiences to their interests and strengths and also aligns with (Novak, 2016).

The study also revealed that participant led UDL implementations were centred on student empowerment, well-being, support, and voice. This focus aligns with UDL's objectives of supporting learner variability through individualised learning pathways. By offering multiple means of engagement, representation, and action and expression, UDL effectively addresses diverse learning preferences and needs. The data demonstrated that this flexibility enabled participants to design lessons that catered to individual student

requirements, fostering a sense of agency and personalised learning experiences. These findings support Rose and Meyer (2002) assertion that educational barriers arise from rigid instructional methods rather than inherent learner capacities. Moreover, McClaskey, (2016) advocates for a shift from passive reception of instruction to active learner engagement. The study supports this view, demonstrating that UDL principles encourage active participation and self-directed learning among students. The Lundy model (2007) of children's participation highlights the importance of creating safe spaces for students to express their views, which UDL facilitates through its emphasis on student voice and choice. Participants reported that this approach demonstrates that the students' perspectives shape educational outcomes, fostering genuine empowerment. The study positions UDL as a transformative paradigm in education, promoting inclusive practices with the potential to support all learners. Drawing on Dewey's notion of learning as a continuous process of growth and development across all aspects of life, the data illustrates how UDL assists educators in proactive planning to meet students' instructional and environmental needs, thereby helping them achieve their full potential, this aligns with Alquraini and Rao (2020) findings. This proactive approach also aligns with Bali (2019) concept of UDL as a Pedagogy of Choice, addressing the mismatch between a diverse student population and a one-size.

6.5 Future Advancements

Ireland's education system at both primary and post primary level is currently undergoing review and reform which has the potential to benefit from the findings of this study. Ireland's macro-level educational policies, particularly the reforms in the Junior Cycle, Senior Cycle, and the Céim Initial Teacher Education (ITE) standards, have been designed to foster a more flexible, inclusive, and student-centred approach to education. These changes are crucial in supporting teachers' agency Gleeson et al. (2020) and to implement Universal Design for Learning (UDL), a framework that promotes inclusive teaching practices by addressing the diverse learning needs, preferences, and abilities of students (Flood & Banks, 2021). This study has looked at UDL implementation across the sectors and has highlighted the ability of teachers to implement UDL with the proper supports at all system levels from the micro

to the chronosystem. At national level reforms in curriculum, assessment and initial teacher education can have a huge impact on teacher agency and the development of UDL in everyday practice.

Junior Cycle Reforms and UDL

The Junior Cycle Framework (2015) marks a significant shift in Irish education by providing schools with greater flexibility to design their curricula to meet the needs of diverse learners. This aligns with the core principles of UDL, which emphasises the importance of flexible teaching practices that can adapt to various student strengths and challenges. By allowing teachers to select from a range of subjects, short courses, and Priority Learning Units (PLUs), schools can tailor educational experiences to suit the individual needs of their students, including those with special educational needs (SEN). This flexibility supports the three main principle of UDL multiple means of engagement, representation and action and expression, which advocates for making learning accessible to all students.

Furthermore, the introduction of Wellbeing as a distinct area of learning within the Junior Cycle promotes a more holistic approach to student development, which is another key principle of UDL. The emphasis on wellbeing supports engagement and self-regulation/emotional capacity in students, which is essential for creating an inclusive and supportive learning environment. By addressing the social, emotional, and physical aspects of students' lives, teachers are better equipped to create an environment that nurtures all aspects of student development.

The dual approach to assessment, which includes both formative and summative assessments, also aligns with UDL. The incorporation of ongoing formative assessment allows teachers to monitor student progress continuously, providing valuable feedback that can be used to adjust teaching methods in real time. This process encourages multiple means of action and expression, as students can demonstrate their understanding in various ways, beyond traditional written exams. Additionally, the Classroom-Based Assessments (CBAs) provide opportunities for students to engage in project-based or performance-based assessments, which supports UDL by supporting

diverse learning preferences and allowing students to showcase their strengths.

Professional development and collaboration among teachers is also vital for implementing UDL effectively. The Junior Cycle reform places a strong emphasis on collaborative professional learning through Subject Learning and Assessment Review meetings and support from the Junior Cycle for Teachers (JCT) service. These opportunities for peer-to-peer learning enable teachers to share best practices and discuss strategies for implementing inclusive teaching practices, such as UDL. By engaging in these collaborative efforts, teachers are empowered to build a deeper understanding of how to address the diverse needs of their students and to refine their teaching practices accordingly.

Senior Cycle Reforms and UDL

The ongoing review of the Senior Cycle curriculum and assessment is another critical development that supports UDL principles. The introduction of 12 new and revised subjects, including topics such as Drama, Film, Theatre Studies, Climate Action and Sustainable Development, expands the range of learning opportunities available to students. This diversification of subjects aligns with UDL by offering students choices that cater to their interests and strengths, thus promoting engagement and motivation. Furthermore, the introduction of Level 1 and Level 2 Learning Programmes for students with special educational needs further underscores the commitment to providing equitable opportunities for all learners, in line with UDL principles.

The new assessment model, which includes both traditional exams and additional assessment components (worth at least 40%), encourages teachers to adopt diverse assessment strategies. This is in line with UDL's emphasis on multiple means of expression and communication, allowing students to demonstrate their knowledge and skills in various ways. By reducing the emphasis on a single, high-stakes examination, the new system provides more opportunities for students to succeed based on their unique learning profiles. This flexibility supports teachers in employing a variety of assessment methods that cater to different student needs and learning preferences.

The introduction of the Level 1 and Level 2 Learning Programmes is another significant development for inclusive education. These programs provide tailored learning experiences for students with additional needs in areas such as communication, literacy, and numeracy, ensuring that students with special educational needs can fully participate in the Senior Cycle. The certification by the State Examinations Commission (SEC) for these programmes further validates students' achievements and promotes an inclusive environment where every student has the opportunity to succeed. This commitment to inclusion supports UDL's goal of providing equitable access to learning and assessment for all students.

Céim ITE Standards and Teacher Agency

The Céim Initial Teacher Education (ITE) standards are foundational in supporting teachers' ability to implement UDL practices in the classroom. These standards emphasise the importance of reflective, research-informed teaching and foster teacher agency, which is critical for the successful application of UDL principles. By encouraging student teachers to engage with research on pedagogy and to develop a reflective practice, the Céim standards ensure that teachers are well-equipped to design and implement inclusive learning environments. This focus on reflection and research allows teachers to continually adapt and refine their practices, ensuring that their teaching methods remain flexible and responsive to the needs of all students.

The Céim standards also underscore the importance of school placement as a central component of teacher education. School placement allows student teachers to apply theoretical knowledge in real classroom settings, where they can practice differentiating instruction, assessing student progress, and implementing inclusive strategies like UDL. The partnership between Higher Education Institutions (HEIs) and schools in providing these placements further supports the development of UDL practices, as student teachers are exposed to diverse teaching methods and learn from experienced educators who are committed to inclusive teaching.

Additionally, the Céim standards emphasise collaboration and professional development. By fostering a collaborative model of teaching, these standards encourage teachers to work together to share strategies, solve problems, and

improve their practice. This is essential for implementing UDL, as teachers can exchange ideas and resources for creating inclusive and accessible learning environments. The standards also encourage continuous professional growth, which helps teachers stay informed about new research, strategies, and technologies that can support UDL.

Ireland's macro-level educational policies, including the reforms to the Junior and Senior Cycles and the Céim Initial Teacher Education standards, provide strong support for the implementation of Universal Design for Learning. These policies offer increased flexibility in curriculum design, diversified assessment methods, and a strong emphasis on professional development and collaboration. By empowering teachers to tailor their teaching to meet the diverse needs of students and by fostering teacher agency through reflective and research-informed practices, these reforms create a robust foundation for the effective implementation of UDL. However, the successful application of UDL will depend on how well these policies are translated into practice in schools and classrooms, requiring ongoing support, resources, and professional development to ensure all teachers have the skills and confidence to implement UDL effectively.

To support the development of systematic UDL Implementation further work at national level should be undertaken. The author suggests that the following should be considered:

1. **Longitudinal Studies:** Conduct longitudinal studies to track the long-term impact of cross-sectoral collaboration and UDL implementation on teacher professional development, student engagement, and learning outcomes. This would provide insights into the sustainability and scalability of these practices over time. Two frameworks that could be used are Lundy (2007) & Hart (1992).
2. **In-depth Case Studies:** Undertake in-depth case studies in diverse educational settings to explore the contextual factors that influence the effectiveness of cross-sectoral collaboration and UDL implementation. This would help identify best practices and potential challenges in different educational contexts.

3. **Teacher Education Programs:** Develop and evaluate teacher education programs that integrate cross-sectoral collaboration and UDL principles into pre-service and in-service teacher education. Assess the effectiveness of these programs in enhancing teacher competencies and promoting inclusive practices.
4. **Technology Integration:** Investigate the role of technology in facilitating cross-sectoral collaboration and UDL implementation. Explore how digital tools and online platforms can support collaborative learning communities and provide personalised learning experiences for students.
5. **Parent and Community Engagement:** Explore strategies for involving parents and community stakeholders in cross-sectoral collaboration efforts and UDL implementation. Investigate how partnerships with external stakeholders can contribute to creating inclusive learning environments and promoting student success.
6. **Higher Education Collaboration:** This study provided an opportunity to build a strong research relationship between the ETB and the authors higher education institutions. Opening up further opportunities to research collaboratively in the future.
7. **Policy Development:** Advocate for policy changes at the local, regional, and national levels to support cross-sectoral collaboration and the adoption of UDL principles in education. This may include allocating resources for professional development, providing incentives for collaboration, and revising curriculum and assessment frameworks to align with inclusive practices.
8. **International Comparisons:** Compare cross-sectoral collaboration and UDL implementation practices across different countries and educational systems to identify global trends and variations. This comparative analysis could inform international policy dialogues and collaborations aimed at promoting inclusive education globally.
9. **Impact on Student Outcomes:** Further investigate the impact of cross-sectoral collaboration and UDL implementation on student outcomes such as academic achievement, graduation rates, and post-secondary

transitions. Use quantitative and qualitative methods to assess the direct and indirect effects of these practices on student success.

By pursuing these avenues for future research, scholars can deepen our understanding of cross-sectoral collaboration and UDL implementation and contribute to the ongoing efforts to create inclusive and equitable learning environments for all students.

6.6 Authors Reflections

The authors role within the CoP was multifaceted and crucial for fostering an inclusive and adaptive learning environment. As both a researcher and facilitator, the author not only transmitted knowledge but endeavoured to represent the principles of UDL throughout the PD process. This approach was essential for creating a dynamic and supportive learning community.

Facilitating a shared vision of inclusivity was a central aspect of the author's role. By modelling UDL principles during PD sessions, the author provided a concrete example of how these principles could be integrated into everyday teaching practices. This alignment with UDL's foundational concepts allowed participants to visualise and implement these strategies in their classrooms. The author designed activities that catered to various learning preferences to demonstrate how UDL can enhance accessibility and engagement for all students, reinforcing the theoretical underpinnings of UDL as described by (Meyer et al., 2014).

In building capacity through collaborative learning, the author endeavoured to foster a supportive environment where participants could share their experiences, challenges, and successes in implementing UDL strategies. This approach aligns with Vygotsky's (1978) social constructivist theory, which emphasises the co-construction of knowledge through social interaction. By creating a space for collective meaning-making and problem-solving, the author sought to facilitate the exchange of ideas and development of practical solutions tailored to specific educational contexts. This collaborative process was further enhanced by the active participation of the educational technology officer, who, along with the author, modelled the collaborative spirit essential for a thriving CoP.

The author's role in demonstrating reflexive practice was also pivotal. Reflexive practice, as conceptualised by Dewy (1933), is crucial for professional growth and improvement. The author's regular reflection on their own teaching practices, coupled with encouragement for participants to engage in similar reflection, fostered a culture of continuous improvement within the CoP. This commitment to ongoing reflection, supported by Brookfield (1995) emphasis on critical reflection in teaching, enabled participants to adapt and refine their instructional methods effectively.

Encouraging risk-taking and innovation was another significant aspect of the author's role. UDL promotes flexibility and creativity in educational practices, and the author's efforts to create a safe environment for experimentation were aligned with these principles (CAST, 2018). By sharing examples of innovative practices, including both successes and challenges, the author helped demystify the process of trying new approaches. This openness aimed to inspire participants to explore new UDL strategies and share their experiences, thus supporting a culture of experimentation and growth.

Finally, the author's role in sustaining the CoP's growth and development was important. Effective leadership is essential for the success and longevity of CoPs (Wenger, 1998). The author's ongoing support and provision of resources were instrumental in maintaining the CoP's vitality. Collaborating with the educational technology officer and Kerry ETBs management team, the author developed plans to ensure the CoP's continued expansion and impact. This commitment to sustainability ensured that the benefits of the CoP extended beyond the study, contributing to the ongoing professional development of participants.

Kerry ETB announced in May 2023 that as a result of the study they were embedding UDL within their new strategic plan. This development highlights the benefits of cross institutional collaboration where ETBs and other institutions can benefit from researching with members of the higher education sector.

The author at the conclusion of this study still holds the belief that addressing the challenges of inclusive education requires leveraging the collective expertise of the entire educational community, and that educators

already possess the core competencies necessary to effectively teach a diverse student body. Furthermore, the author holds that all students have an inherent capacity to learn when provided with an appropriately designed educational environment.

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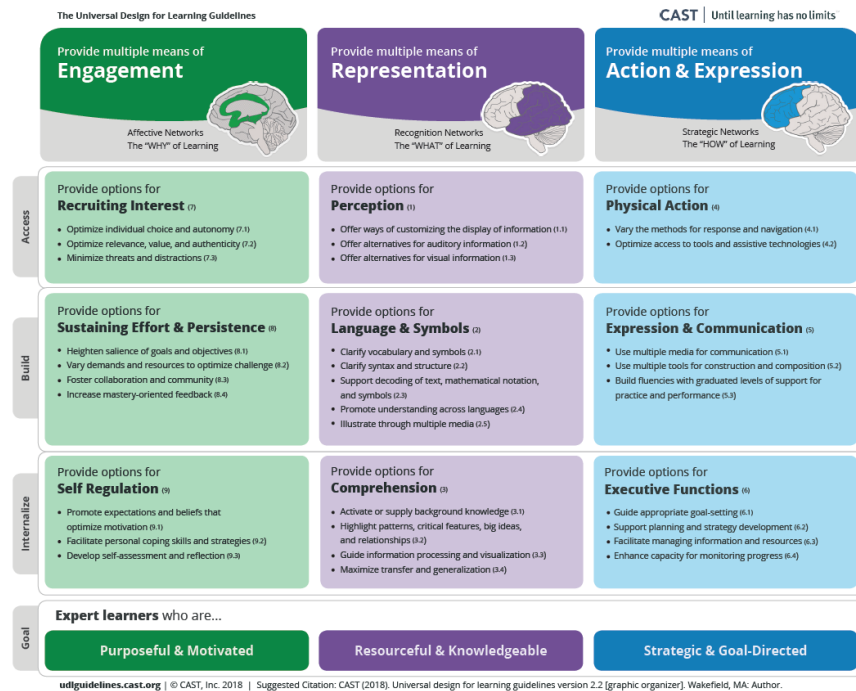
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Appendices

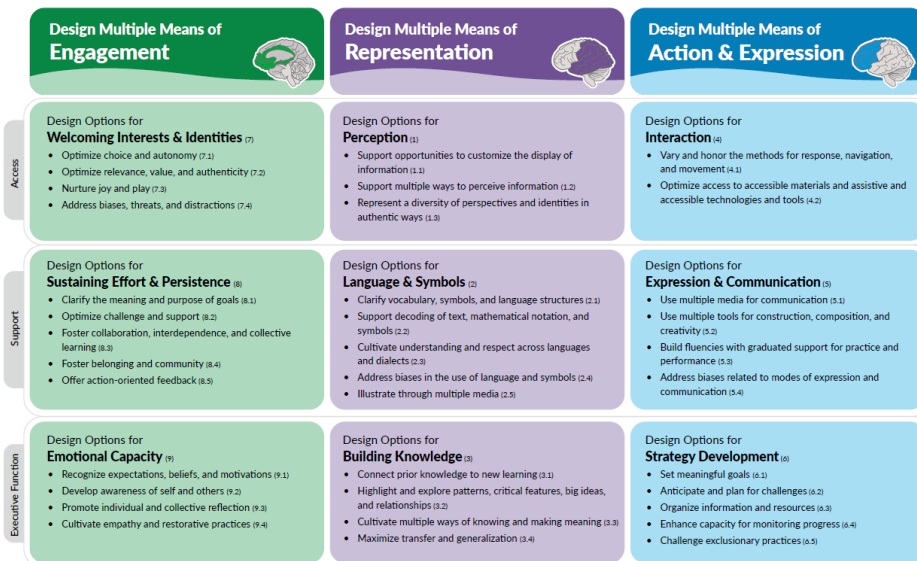
Appendix 1 UDL Framework 2.2



Appendix 2 UDL Framework 3.0

The Universal Design for Learning Guidelines

The goal of UDL is **learner agency** that is purposeful & reflective, resourceful & authentic, strategic & action-oriented.



 CAST | Until learning has no limits®

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Suggested Citation: CAST (2024). Universal Design for Learning Guidelines version 3.0 [graphic organizer]. Lynnfield, MA: Author.

Appendix 3 Project Information Leaflet





Kerry ETB UDL Champions

The Project

1. This is an action research project that will provide expert training and support to two UDL Champions within schools and FET centres in Kerry ETB.
2. One of the main goals of the project is to create a UDL Champions 'Community of Practice' to support and develop the UDL implementation process.
3. The project will offer all UDL Champions the opportunity to co-create a UDL micro-credential which can be offered to all staff within Kerry ETB.

What is UDL?

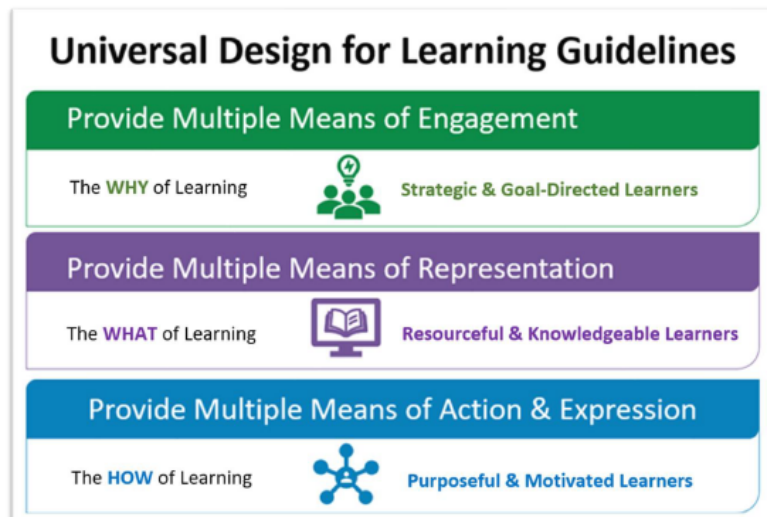
Universal Design for Learning (UDL) is a framework that supports schools in the design and development of flexible curriculum that gives All students equal opportunities to learn. It is a set of principles that enables equitable access and participation in education to All. UDL is an ongoing process that is driven by student voice and student outcomes.

The ultimate goal of UDL is to create learners who are "purposeful & motivated, resourceful & knowledgeable, strategic & goal oriented", students who are experts in their own ability to learn.



With UDL, teachers transition their role to facilitator, removing barriers to learning by giving students options and choice that empower them to take control of their own learning.

By using the UDL framework educators can accept learner variability as a strength to be leveraged, not a challenge to be overcome. (Rose & Meyer, 2002)



For more information, the UDL Cast Guidelines can be found at:

<https://udlguidelines.cast.org/>



BOARD DEPUTIES
JEWISH COMMUNITIES
KERRY EDUCATION
AND TRAINING BOARD

Project Schedule

This is a two-year project that will provide expert training and support on the UDL Framework and Technology Enhanced Teaching and Learning to all participants.

Year One

- Examine and document participants experience with technology and inclusive practice in the school year 2020-21.
- Examine and document participants attitudes to technology for inclusion.
- Measure the participants understanding of UDL.
- Create a Community of Practice
- Deliver UDL and technology training.
- Participants will plan a UDL solution for their practice.

Year Two

- The researchers will continue to develop and support the Community of Practice.
- Participants will document and implement a UDL solution in their practice.
- The researchers will offer advice, support, and monitor participant's progress.
- The researchers will collate and analyse data from the implementation process.
- The researchers will develop a UDL badge for whole school practice.



The time commitment required for this project is two hours per week during term time, commencing October 2021. One hour will be spent on UDL and Technology training and the second hour on building the Community of Practice. A full range of support resources will be provided to all participants and can be accessed for self-study at any time.



Technology plays a key role in implementing UDL. We want this project to be as practical as possible, therefore we will be utilising the Office 365 tools that teachers and students currently have access to. The aim is to build on their existing skills and knowledge.



Appendix 4 Survey 1-3 Questions

Survey One

UDL Champions Project: Survey One

This survey is the first of three surveys that you are required to complete throughout this research project. Please ensure that you enter your participants ID which has been given to you by the researcher. Time required to complete this survey is approximately 25 minutes.

* Required

Participants Information

1. Please enter your participants ID number *

2. What is your job title? *

3. How many years have you been teaching? *

- ☐ 1 - 5 Years
- ☐ 5 - 10 Years
- ☐ 10 - 15 Years
- ☐ 15 - 20 Years
- ☐ 20 - 25 Years
- ☐ 25 -30 Years

4. Do you hold any of the following qualifications in Education? [Please tick all that apply]

- ☐ A Primary Degree in Education (B.Ed)
- ☐ A Postgraduate Certificate in Education
- ☐ A Postgraduate Diploma in Education
- ☐ A Masters in Education (MEd)
- ☐ A Professional Masters in Education (PME)
- ☐ A Doctor of Philosophy in Education (PhD)
- ☐ A Doctorate in Education (D.Ed.)
- ☐ Other

5. Do you hold any of the following qualifications in Special Education? [Please tick all that apply]

- ☐ A Postgraduate Certificate in SEN
- ☐ A Postgraduate Diploma in SEN
- ☐ A Masters Degree in SEN
- ☐ A Doctor of Philosophy in Education (PhD) SEN
- ☐ A Doctorate in Education (D.Ed.) SEN
- ☐ Other

6. Do you hold a qualification in any other Subject area?

7. At which level do you currently teach? *

- ☐ Primary
- ☐ Secondary
- ☐ FET

8. Which class or classes do you currently teach? [Please tick all that apply] *

- ☐ Junior Infants
- ☐ Senior Infants
- ☐ First Class
- ☐ Second Class
- ☐ Third Class
- ☐ Fourth Class
- ☐ Fifth Class
- ☐ Sixth Class
- ☐ Other

9. Which year groups do you teach? [Please tick all that apply] *

- ☐ First Year
- ☐ Second Year
- ☐ Third Year
- ☐ Transition Year
- ☐ Fifth Year
- ☐ Sixth Year
- ☐ Other

10. Which of the following Junior Cycle subjects do you teach? [Please tick all that apply]

- ☐ Applied Technology
- ☐ Coding
- ☐ Civic, Social and Political Education
- ☐ Business Studies
- ☐ Classics
- ☐ Digital Media Literacy (DML)
- ☐ English
- ☐ French
- ☐ Gaeilge
- ☐ Geography
- ☐ German
- ☐ Graphics
- ☐ History
- ☐ Home Economics
- ☐ Italian
- ☐ Mathematics
- ☐ Metal Work
- ☐ Music
- ☐ Physical Education (PE)
- ☐ Religious Education
- ☐ Science
- ☐ Social, Personal and Health Education (SPHE)
- ☐ Spanish
- ☐ Visual Art
- ☐ Wood Technology

11. Which of the following Senior Cycle subjects do you teach? [Please tick all that apply]

- ☐ Accounting
- ☐ Agricultural Science
- ☐ Applied Mathematics
- ☐ Art
- ☐ Biology
- ☐ Business
- ☐ Chemistry
- ☐ Computer Science
- ☐ Construction Studies
- ☐ Design and Communication Graphics
- ☐ Economics
- ☐ Engineering
- ☐ English
- ☐ French
- ☐ Gaelige
- ☐ Geography
- ☐ German
- ☐ History
- ☐ Home Economics
- ☐ Mandarin Chinese
- ☐ Mathematics
- ☐ Music
- ☐ Physical Education
- ☐ Physics
- ☐ Politics and Society

☐ Religious Education

☐ Spanish

☐ Technology

☐ Other

12. Which course(s) do you teach on? [Please tick all that apply] *

☐ PLC

☐ Part-Time

☐ Youthreach

☐ VTOS

☐ Other

13. Which subject(s) do you teach? *

The role of Technology in your teaching

14. Have you participated in technology skills CPD within the last 5 years? *

☐ Yes

☐ No

15. What type of CPD did you take part in? *

☐ Face to Face Training Courses or Workshops

☐ Online Training Courses or Webinars

☐ Studying for a qualification or accreditation

☐ Other

16. Prior to **March 2020** did you use technology in your classroom e.g. software programs, apps, electronic whiteboards etc.? *

☐ Yes

☐ No

17. Which technologies did you use e.g. software programs, apps, electronic whiteboards etc.?

18. How confident were you in the use of these technologies in your classroom?

- ☐ Extremely confident
- ☐ Very confident
- ☐ Somewhat confident
- ☐ Not confident

19. Did you use technologies to support students with identified additional support needs in your classroom?

- ☐ Yes
- ☐ No

20. Which technologies did you use to support students with identified additional support needs? [Please give details]

21. How confident were you in the use of technology to support students with identified additional support needs in your classroom?

- ☐ Extremely confident
- ☐ Very confident
- ☐ Somewhat confident
- ☐ Not confident

22. Prior to **March 2020** what devices did your students have access to in the classroom?

- ☐ Tablet
- ☐ Laptop
- ☐ Desktop
- ☐ Mobile Phone
- ☐ None
- ☐ Other

23. In **March 2020** how would you have rated your technology skills (1 being the least level of knowledge)? *

1	2	3	4	5
---	---	---	---	---

24. In **March 2020** did your School/College/Centre move to online teaching and learning. *

- ☐ Yes
- ☐ No

25. In **March 2020** how familiar were you with online teaching methods? *

- ☐ Very familiar
- ☐ Somewhat familiar
- ☐ Unfamiliar
- ☐ Very unfamiliar

26. Did you get support from your School/College/Centre in the move to online teaching?
(Please give details)

27. Were there opportunities to collaborate with your colleagues online? (Please give details)

28. Did you have an opportunity to build a community of practice (CoP) with your colleagues online? [For the purpose of this question a CoP is defined as an organised group of people who collaborate regularly around a specific area to achieve predetermined goals]. (Please give details)

29. How successful do you feel the transition to online learning was? *

- ☐ Very Successful
- ☐ Successful
- ☐ Neither successful nor unsuccessful
- ☐ Unsuccessful

30. Were there any positive effects for your students in the online classroom? *

- ☐ Yes
- ☐ No

31. Please give details of the positive effects for your students in the online classroom. *

32. How would you rate your technology skills in 2021? (1 being the least level of knowledge)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

33. Did the experience of teaching online change your attitude to technology for teaching? *

☐ Yes

☐ No

34. Please give details of how the experience of teaching online changed your attitude to technology for teaching? *

35. Do you feel that your students would benefit from more access to technology in the face-to-face classroom? *

☐ Yes

☐ No

☐ Maybe

36. Are there any technologies you would like to incorporate into your face-to-face teaching?

Inclusive Practice

37. What does inclusive practice mean to you? *

38. What support structures are available within your school to assist you in the implementation of inclusive practice?

39. Do you feel that there are barriers to inclusive practice within the education system that affect your classroom practice? *

- ☐ Yes
- ☐ No
- ☐ Maybe

40. At what level do you feel that there are barriers to inclusive practice that affect your classroom practice? [Please tick all that apply] *

- ☐ System Level [i.e. Policy]
- ☐ Institutional level [i.e. supports and resources]
- ☐ Classroom level [i.e. supports and resources]
- ☐ Personal level [i.e. supports and resources]
- ☐ Other

41. Please give details of these barriers to inclusive practice and how they affect your practice.

42. Have you participated in inclusive practice CPD within the last 5 years?

☐ Yes

☐ No

43. What type of CPD did you take part in? *

☐ Training Course and Workshop

☐ Online Courses or Webinars

☐ Studying for a qualification or accreditation

☐ Peer group exchanges

☐ Attending Conference online or face to face

☐ Other

Universal Design for Learning

44. What is your understanding of Universal Design for Learning (UDL) *

45. When did you first hear about Universal Design for Learning (UDL) *

46. Starting out on this project how would you rank your understanding of Universal Design for Learning (UDL) (1 being least level of understanding)? *

1	2	3	4	5
---	---	---	---	---

47. What do you hope to gain from participating in this research project? *

Survey Two

UDL Champions Project: Survey Two

This survey is the second of three surveys that you are required to complete throughout this research project. Please ensure that you enter your **participants ID** which has been given to you by the researcher. Time required to complete this survey is approximately 30 minutes.

* Required

Participants Information

1. Please enter your participants ID number *

2. What is your job title? *

3. How many years have you been teaching? *

- ☐ 1 - 5 Years
- ☐ 5 - 10 Years
- ☐ 10 - 15 Years
- ☐ 15 - 20 Years
- ☐ 20 - 25 Years
- ☐ 25 -30 Years

4. Do you hold any of the following qualifications in Education? [Please tick all that apply]

- ☐ A Primary Degree in Education (B.Ed)
- ☐ A Postgraduate Certificate in Education
- ☐ A Postgraduate Diploma in Education
- ☐ A Masters in Education (MEd)
- ☐ A Professional Masters in Education (PME)
- ☐ A Doctor of Philosophy in Education (PhD)
- ☐ A Doctorate in Education (D.Ed.)
- ☐ Other

5. Do you hold any of the following qualifications in Special Education? [Please tick all that apply]

- ☐ A Postgraduate Certificate in SEN
- ☐ A Postgraduate Diploma in SEN
- ☐ A Masters Degree in SEN
- ☐ A Doctor of Philosophy in Education (PhD) SEN
- ☐ A Doctorate in Education (D.Ed.) SEN
- ☐ Other

6. Do you hold a qualification in any other Subject area?

7. At which level do you currently teach? *

- ☐ Primary
- ☐ Secondary
- ☐ FET

8. Which class or classes do you currently teach? [Please tick all that apply] *

- ☐ Junior Infants
- ☐ Senior Infants
- ☐ First Class
- ☐ Second Class
- ☐ Third Class
- ☐ Fourth Class
- ☐ Fifth Class
- ☐ Sixth Class
- ☐ Other

9. Which year groups do you teach? [Please tick all that apply] *

- ☐ First Year
- ☐ Second Year
- ☐ Third Year
- ☐ Transition Year
- ☐ Fifth Year
- ☐ Sixth Year
- ☐ Other

10. Which of the following **Junior Cycle** subjects do you teach? [Please tick all that apply]

- ☐ Applied Technology
- ☐ Coding
- ☐ Civic, Social and Political Education
- ☐ Business Studies
- ☐ Classics
- ☐ Digital Media Literacy (DML)
- ☐ English
- ☐ French
- ☐ Gaelge
- ☐ Geography
- ☐ German
- ☐ Graphics
- ☐ History
- ☐ Home Economics
- ☐ Italian
- ☐ Mathematics
- ☐ Metal Work
- ☐ Music
- ☐ Physical Education (PE)
- ☐ Religious Education
- ☐ Science
- ☐ Social, Personal and Health Education (SPHE)
- ☐ Spanish
- ☐ Visual Art
- ☐ Wood Technology

- ☐ Other

11. Which of the following **Senior Cycle** subjects do you teach? [Please tick all that apply]

- ☐ Accounting
- ☐ Agricultural Science
- ☐ Applied Mathematics
- ☐ Art
- ☐ Biology
- ☐ Business
- ☐ Chemistry
- ☐ Computer Science
- ☐ Construction Studies
- ☐ Design and Communication Graphics
- ☐ Economics
- ☐ Engineering
- ☐ English
- ☐ French
- ☐ Gaelige
- ☐ Geography
- ☐ German
- ☐ History
- ☐ Home Economics
- ☐ Mandarin Chinese
- ☐ Mathematics
- ☐ Music
- ☐ Physical Education
- ☐ Physics
- ☐ Politics and Society

☐ Religious Education

☐ Spanish

☐ Technology

☐ Other

12. Which course(s) do you teach on? [Please tick all that apply] *

☐ AL

☐ BTEI

☐ ESOL

☐ Part-Time

☐ PLC

☐ SST

☐ Youthreach

☐ VTOS

☐ Other

13. Which subject(s) do you teach? *

Participation in the UDL Champions Project

14. Why did you choose to participate in this project? *

15. Did you find participating in the project this year worthwhile? *

☐ Yes

☐ No

16. Which aspect(s) of the project so far have you found most effective?

17. Did you think the online delivery format was effective?

☐ Yes

☐ No

18. Did you engage with the online resources in the staff OneNote notebook in Teams? *

☐ Yes

☐ No

19. How useful did you find the online resources in the staff OneNote notebook in Teams (1 being least useful)?

1	2	3	4	5
---	---	---	---	---

20. Currently how would you rank your understanding of Universal Design for Learning (UDL) (1 being least level of understanding)? *

1	2	3	4	5
---	---	---	---	---

21. Briefly state your understanding of UDL as it relates to your teaching environment. *

22. In what way(s) do you feel your students/learners would benefit from UDL? *

23. Has your understanding of inclusive practice changed as a result of taking part in the UDL Champions project?

☐ Yes

☐ No

24. How has your understanding of inclusive practices changed?

25. Have you spoken to colleagues about UDL Implementation? *

☐ Yes

☐ No

26. Have you presented feedback about this project in your workplace? *

☐ Yes

☐ No

27. What feedback did you give? *

28. Have you spoken to your Principal or Manager about UDL implementation? *

☐ Yes

☐ No

29. Do you feel supported to implement UDL in your workplace? *

☐ Yes

☐ No

30. Is UDL part of your Whole School/College/Centre Plan?

☐ Yes

☐ No

☐ I'm not sure

31. What resources and supports do you need to help you implement UDL in your Teaching?

UDL Implementation Plan

32. Why have you chosen this implementation plan? *

33. Briefly describe your implementation? *

34. Which of the following UDL Principles will you include in your implementation? *

- ☐ Multiple Means of Engagement
- ☐ Multiple Means of Representation
- ☐ Multiple Means of Action and Expression

35. Give a brief description of the participants in your implementation group and any specific learning support requirements you considered in the design for your implementation plan? *

36. How many Students will take part in your implementation project? *

37. How will you include the student voice in your implementation project? *

38. How will you measure the success of your implementation project? *

Reflections

39. What have been your key takeaways for the first year of UDL Champions project? *

40. Is there anything that you would change or add to our UDL Champions project group sessions for next year? *

41. What are your expectations for year two of the project? *

Survey Three

UDL Champions Project: Survey Three

This survey is the third of three surveys that you are required to complete throughout this research project. Please ensure that you enter your **participants ID** which has been given to you by the researcher. Time required to complete this survey is approximately 20 minutes.

* Required

Participants Information

1. Please enter your participants ID number *

2. What is your job title? *

3. At which level do you currently teach? *

- ☐ Primary
- ☐ Secondary
- ☐ FET

Participation in the UDL Champions Project

4. How beneficial did you find participating in the UDL Champions project (1 being least beneficial 5 being most beneficial)? *

1	2	3	4	5
---	---	---	---	---

5. Which aspects of this project did you find most beneficial? *

	Extremely helpful	Very helpful	Somewhat helpful	Not so helpful	Not at all helpful
UDL Training	☐	☐	☐	☐	☐
IT Training	☐	☐	☐	☐	☐
Community of Practice	☐	☐	☐	☐	☐
UDL Implementation	☐	☐	☐	☐	☐

6. How has participating in this project impacted on your teaching? *

7. Through your UDL implementation has your understanding of inclusive practice changed. *

- ☐ Yes
- ☐ No

8. Please give examples of how your understanding of inclusive practice has changed.

9. At the end of this project how would you rank your understanding of of inclusive practice (1 being least level of understanding)?

1	2	3	4	5
---	---	---	---	---

10. At the end of this project how would you rank your understanding of Universal Design for Learning (UDL) (1 being least level of understanding)?

1	2	3	4	5
---	---	---	---	---

Your own UDL Implementation Plan

11. Briefly describe your implementation project? *

12. Why did you choose this implementation plan? *

13. How many **Students** took part in your implementation project (please give numbers)? *

14. Which of the following UDL Principles did you include in your implementation? *

- ☐ Multiple Means of Engagement
- ☐ Multiple Means of Representation
- ☐ Multiple Means of Action and Expression

15. How successful was your chosen UDL Implementation for your **Students** (1 being least successful 5 being most successful) *

1	2	3	4	5
---	---	---	---	---

16. How do you plan to embed UDL in your teaching going forward? *

School/Centre UDL Implementation Plan

17. Have you spoken to colleagues about your UDL Implementation? *

- ☐ Yes
- ☐ No

18. Have you spoken to your Principal or Manager about UDL implementation? *

- ☐ Yes
- ☐ No

19. Is UDL part of your Whole School/College/Centre Plan?

- ☐ Yes
- ☐ No
- ☐ I'm not sure

20. How does your school/centre plan to embed UDL in teaching and Learning *

21. Have you provided training to other staff members in your workplace? *

- ☐ Yes
- ☐ No

22. Please give details of this training *

23. Do you feel supported to implement UDL in your workplace? *

- ☐ Yes
- ☐ No

24. What resources and supports do you need to develop UDL implementation in your school/centre

25. What recommendations would you make on developing a whole school/centre approach to UDL *

Reflections

26. What have been your key takeaways from the UDL Champions project? *

27. Would you be interested in taking part in a 20 minute online interview with the researcher about your experience on the project. All interviews will be anonymised and recordings deleted once transcribed. *

☐ Yes

☐ No

28. Please give your name and preferred email address to be contacted on to arrange the interview time. *

Appendix 5 Survey Email One

UDL Champions Survey One

Dear,

I am delighted you are involved in the Universal Design for Learning (UDL) Champions project. I really appreciate the time and effort it takes to be part of such an ambitious project. I hope that you will benefit both personally and professionally by being part of this group. Please feel free to contact me at any stage if you have any questions or queries.

As you know, I need you to complete three surveys throughout this project. These surveys are completely anonymous. I have created a unique ID code for you; this will be used on all three surveys.

The survey itself is accessed by the Microsoft link below and should take you about 20-25 minutes to complete. Please give as much detail as possible in your answers as this will make the data much richer and informative.

Your ID No: UDLC-2-***

Please click the Survey Link: *****

Kind Regards

Appendix 6 Reporting Criteria

1

Reporting Criteria

Area and Criteria	Notes
1. Learner Variability and Environment UDL provides guidelines for addressing learner variability and designing learning environments that are supportive for all learners. The following criteria relate to the information provided on learners and the environment in relation to the use of UDL.	
a) Purpose of the intervention - Why did you choose to do this intervention/practice? - What are your planned outcomes? - How will you measure these outcomes?	
b) Participant information Describe learner variability by : - Describing the participants and general variability factors? i.e., skills level or needs - How many participants will be involved in the implementation? - Age range of participants	
b) Setting Describe the setting for the practice/intervention (e.g., Classroom setting, Class Year or group, type of school or FET setting.)	
2. Proactive and Intentional Design An essential aspect of UDL is proactive and intentional design of curriculum, instructional and educational environments. The following criteria relate to the use of UDL in the design phase.	
a) Addressing Barriers and/or Increasing Access Provide a description of: Specific challenges or barriers that the practice or intervention is intended to reduce or eliminate This can include barriers and/or access related to environment, curriculum, and/or instruction.	
b) Designing to Address Variability Describe aspects of the design that address variability. This can include a description of how flexibility, choice, or engagement will be addressed in the practice/intervention.	

c) Application of UDL Guidelines and Checkpoints Provide details about how and which of the nine UDL guidelines and/or the 31 checkpoints are applied to the practice/intervention. This can include information on how UDL guidelines and checkpoints are applied to goals, assessments, methods, and/or materials.		
3. Implementation and Outcomes Information about how the UDL-based practice is implemented and about outcomes related to UDL are provided.		
a) Description of Implementation of Practice/Intervention Describe how the UDL-aligned practice or intervention is conducted/implemented. Highlight information on the UDL-based aspects of the practice and intervention (the UDL based aspects should align with what is described in 2c)		
b) Outcomes/Findings in relation to UDL Describe the overall outcomes of the intervention/practice.		
c) Implications Describe the implications of the outcomes/ findings in relation to UDL-based aspects of practice/intervention. (What are the next steps)		
d) Limitations? Were there any to the implementation of the intervention or practice		

When completed please email to

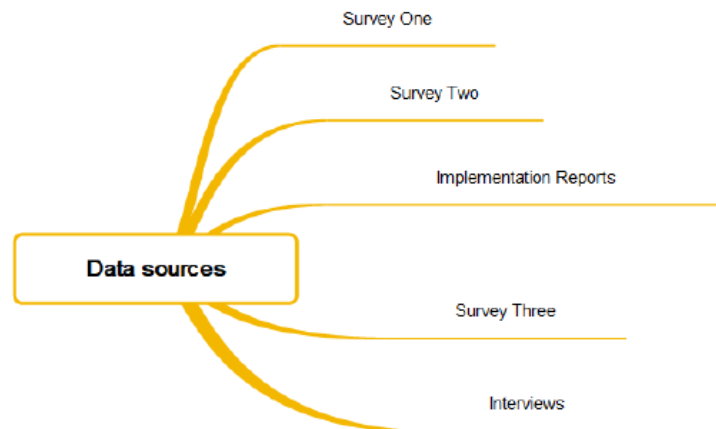
Adapted from

Rao, K., Smith, S.J., Edyburn, D., Grima-Farrell, C., Van Horn, G., Yalom-Chamowitz, S. (2018). *UDL Reporting Criteria*. Developed by a working group of the Universal Design for Learning Implementation and Research (UDL-IRN) Research Committee. Retrieved from <https://udl-irn.org/udl-reporting-criteria/>



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Appendix 7 Framing Lenses used for initial familiarisation with the data



1. Understanding of Inclusive Practice

- Participants awareness of inclusive strategies
- Individual knowledge about learner variability
- School/centre current support for implementation of inclusive practice

2. UDL Awareness

- Participants awareness of UDL principles and strategies
- Knowledge about the UDL framework and its components
- Understanding the importance of UDL in addressing learner variability

3. Improved identification

- Participants ability to identify diverse learning needs
- Recognition of individual student strengths and weaknesses
- Identifying various learning preferences and challenges

4. Proactive Supports

- Strategies for proactively addressing learner variability
- Customisation of instruction based on identified needs
- Impact of providing support and resources through a UDL approach for learners

5. Professional Development

- Impact of UDL and ICT training and workshops for participants
- Influence of ongoing professional development in UDL

- Teacher confidence in implementing

6. Learner Engagement

- Enhancing student engagement through UDL principles
- Capturing and maintaining student interest and motivation
- Facilitating active participation of all learners

7. Collaboration

- Collaboration among participants to share UDL practices
- Co-ordinating efforts to support learners with diverse learning needs
- Collaborative problem-solving related to learner variability

8. Barriers and Challenges

- Obstacles faced in implementing UDL
- Resistance to change or adoption of UDL strategies
- Resource limitations and constraints

9. Student Outcomes

- Impact of UDL on student performance and learning outcomes
- Changes in academic achievement, behaviour and agency
- Testimonials or evidence of positive results

10. Continuous Improvement

- Reflecting on UDL implementations and adjusting practices
- Strategies for continuous improvement in addressing learner variability
- Feedback loops and evaluation of UDL effectiveness

11. Personal Experiences

- Participants personal stories anecdotes related to UDL
- Insights gained from applying UDL in the classroom
- Emotional response and personal growth

12. Research and Literature

- References to UDL research, literature, or best practices
- Citing experts in the field of UDL
- Awareness of the theoretical underpinnings of UDL

Appendix 8 Code Book

1. **Effectiveness of Technology-Enhanced Learning TEL:** This theme looks at new learning around the use of technology to support inclusion. **Code: [TEL and new technology]**
2. **Differentiation vs Flexibility** This theme looks at teachers attitudes to differentiation as they progress through the project. **Code: [learner ability]**
3. **Understanding and Implementing UDL:** This theme looks at gaining a better understanding of UDL, advocating for inclusion through UDL and Access to resources and strategies for UDL. **Code: [Implementation of UDL]**
4. **Collaboration and Knowledge Sharing:** This theme looks at the effects of collaboration between participants in the CoP **Code: [Sharing ideas with colleagues]**
5. **Practical vs. Theoretical Learning:** This theme looks at applying UDL in everyday classroom environments **[Practical application of theory]**
6. **Engagement and Active Learning:** This theme looks at active learning of participants within the project environment **Code: [Active learning]**
7. **Resource Discovery and Utilisation:** This theme looks at how the participants used the resources made available to them during the project **Code: [Discovering resources]**
8. **Effective Presentation and Pedagogical Techniques:** This theme looks at the skills development of the participants **Code: [Application of Learning]**
9. **Professional Growth:** This theme looks at enhancing confidence in applying knowledge, with regard to Technology and UDL. **Code [Continuous Learning]**
10. **Inclusivity and Accessibility:** This theme revolves around the idea that every learner should have equal access to course content. **Code: [Inclusivity]**
11. **Time:** This theme looks at the value of time allocation to supporting Implementation **Code: [Time]**

12. **Impact on Students learning:** This theme looks at student experience
Code: [Student]
13. **Teacher Impact:** This theme looks at the impact on the teachers practice
Code: [Teacher]
14. **Feedback:** This theme looks at the mechanisms for gathering feedback
Code: [Electronically or Personally]
15. **UDL promotion:** This theme looks at expanding UDL practice beyond the individual to school practice
Code: [UDL Promotion]
16. **Embedding UDL:** This theme looks at a systematic approach to embedding UDL at whole school level
Code: [Whole School Student focus Staff focus]
17. **School/Centre Management support:** This theme looks at the need for top-down support
Code: [Management Support]

Appendix 9 Combined Codes and Themes

Step Three: Combine codes to themes.

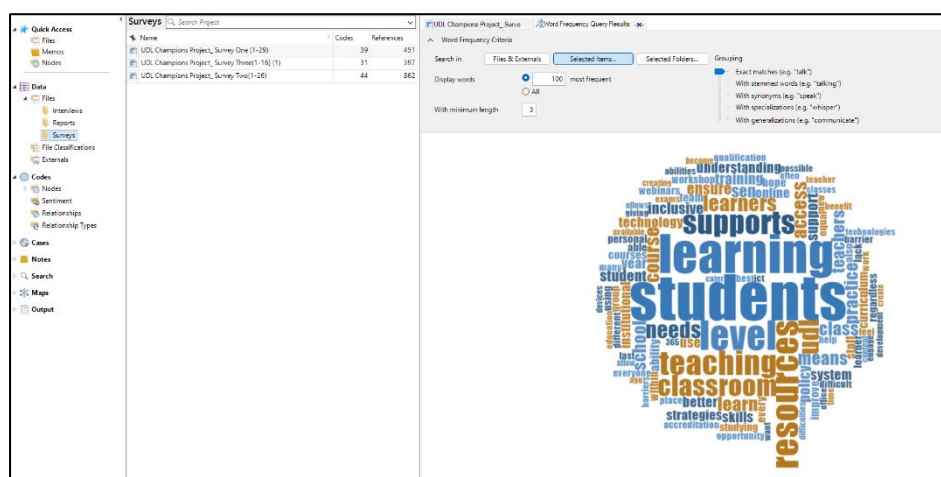
Framing lens used to familiarise the author with the data and the actual themes that were identified in the line-by-line data analysis

Framing lens	Actual Theme and Code
Understanding of inclusive practise - Participants' awareness of inclusive strategies. - Individual knowledge about learner variability. - School supports for implementation of inclusive practice. - Participants understanding of barriers to inclusive practice.	Inclusivity and Accessibility: This theme revolves around the idea that every learner should have equal access to course content. Code: [Inclusivity]
UDL awareness - Participants' awareness of UDL principles and strategies. - Knowledge about UDL framework and its components. - Understanding the importance of UDL in addressing learner variability.	Understanding and Implementing UDL: This theme looks at gaining a better understanding of UDL, advocating for inclusion through UDL and Access to resources and strategies for UDL. Code: [Implementation of UDL] Differentiation vs Flexibility This theme looks at teachers attitudes to differentiation as they progress through the project. Code: [learner ability]
Improved identification - Participants' ability to identify diverse learner needs. - Recognition of individual students' strengths and weaknesses. - Identifying various learning preferences and challenges.	Differentiation vs Flexibility This theme looks at teachers attitudes to differentiation as they progress through the project. Code: [learner ability] Inclusivity and Accessibility: This theme revolves around the idea that every learner should have equal access to course content. Code: [Inclusivity]
Proactive Support - Strategies for proactively addressing learner variability. - Customisation of instruction based on identified needs.	Effectiveness of Technology-Enhanced Learning TEL: This theme looks at new learning around the use of technology to support inclusion. Code: [TEL and new technology] Resource Discovery and Utilisation: This theme looks at how the

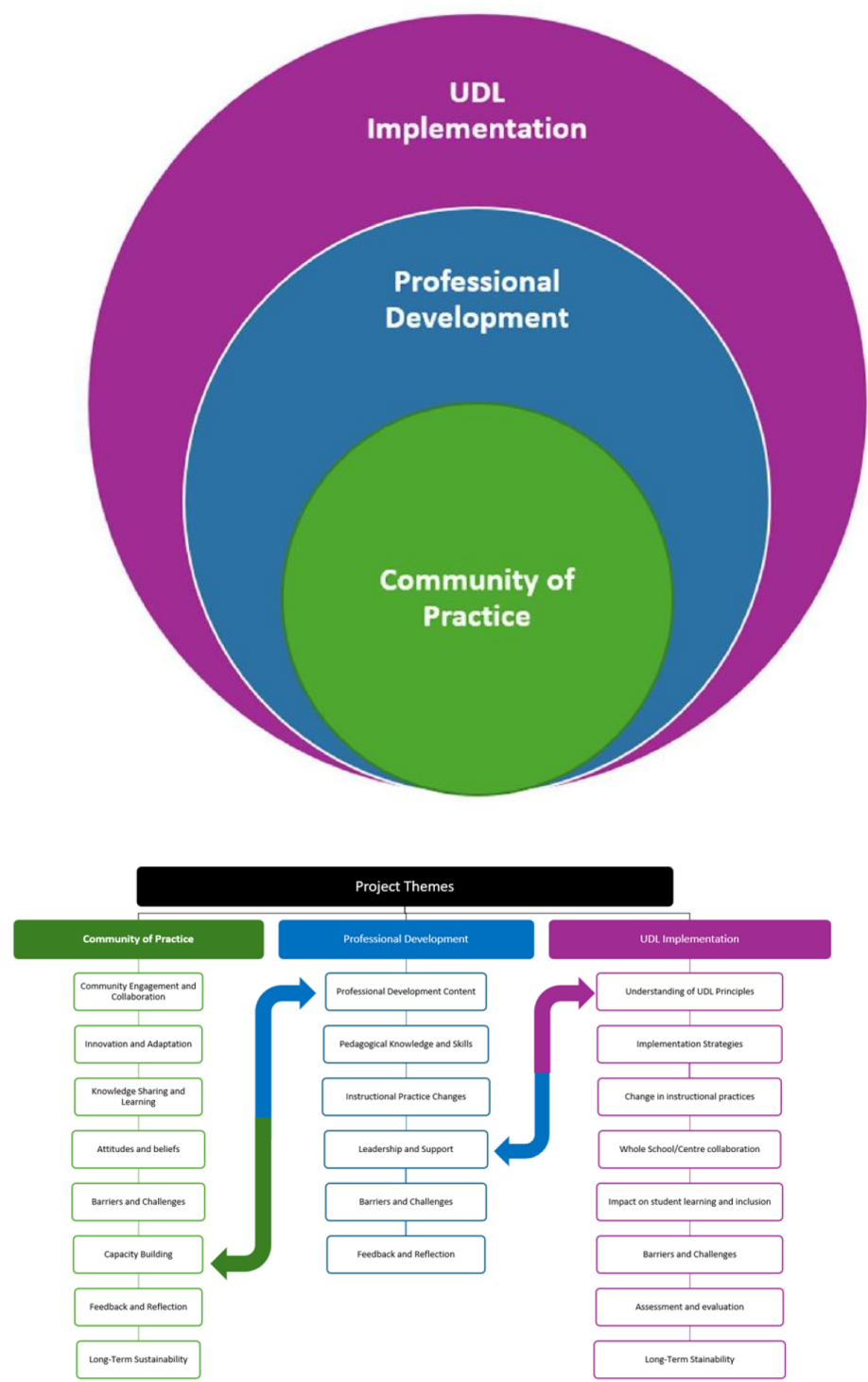
Impact of providing support and resources to a UDL approach for learners.	participants used the resources made available to them during the project Code: [Discovering resources]
Professional development - Impact of UDL training and workshops on Participants. - Influence of ongoing professional development in UDL. - Teacher confidence in implementing UDL practises.	Professional Growth: This theme looks at enhancing confidence in applying knowledge, with regard to Technology and UDL. Code [Continuous Learning]
Learner engagement - Enhancing student engagement through UDL principles. - Capturing and maintaining student interest and motivation. - Facilitating active participation of all learners.	Differentiation vs Flexibility This theme looks at teachers attitudes to differentiation as they progress through the project. Code: [learner ability] Practical vs. Theoretical Learning: This theme looks at applying UDL in everyday classroom environments [Practical application of theory] Engagement and Active Learning: This theme looks at active learning of participants within the project environment Code: [Active learning]
Collaboration - Collaboration among Participants to share UDL practices. - Coordinating efforts to support learners with diverse needs. - Collaborative problem solving related to learner variability.	Collaboration and Knowledge Sharing: This theme looks at the effects of collaboration between participants in the CoP Code: [Sharing ideas with colleagues]
Barriers and Challenges - Obstacles faced in implementing UDL. - Resistance to change or adoption of UDL strategies. - Resource limitations and constraints.	Time: This theme looks at the value of time allocation to supporting Implementation Code: [Time]
Student outcomes - Impact of UDL on student performance and learning outcomes. - Changes in academic achievement behaviour and self-esteem. - Testimonials are evidence of positive results.	Impact on Students learning: This theme looks at student experience Code: [Student]
Continuous improvement Reflecting on UDL implementation and adjusting practices.	Practical vs. Theoretical Learning: This theme looks at applying UDL in everyday classroom environments [Practical application of theory]

• Strategies for continuous improvement in addressing learner variability. • Feedback loops and evaluation of UDL effectiveness.	• Resource Discovery and Utilisation: This theme looks at how the participants used the resources made available to them during the project Code: [Discovering resources] • Feedback: This theme looks at the mechanisms for gathering feedback Code: [Electronically or Personally]
Personal Experience • Participants' personal stories and anecdotes related to UDL. • It's gained from applying UDL in the classroom. • Emotional responses and personal growth.	• Teacher Impact: This theme looks that the impact on the teachers practice Code: [Teacher]

Appendix 10 NVivo Coding



Appendix 11 Draft Themes



Appendix 12 Ethical Approval



Jean Real Ethical Approval

1 message

Phdrsrch
To: Jean Reale

22 September 2021 at 09:46

22 September 2021

Dear Jean,

The School of Education's Ethics Committee has received and considered your amended application for approval of your Level 1 PhD research project "**Universal Design for Learning (UDL) Champions Project**"

It is the decision of the Committee that your research project is approved on the condition that it is carried out as indicated on your application. Should there be a change in the design of your research project, you will need to re-apply again for approval from the School of Education's Ethics Committee.

If you have any queries regarding this decision, please contact the Chair of the School of Education's Ethics Committee and Director of Research, Dr Joseph Roche

We wish you all the very best with your research project.

Kind regards,

Research Officer at the School of Education

Director of Research

Appendix 13 Participants Consent Form



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

STUDY NAME: Centre ID: School of Education Identification Number for study:	
There are three sections in this form. Each section has a statement and asks you to tick the box if you agree. The end of this form is for the researchers to complete. Please ask <u>any</u> questions you may have when reading each of the statements. Please leave the box blank if you do not agree. Thank you for participating.	
General	Tick box
I confirm I have read and understood the Information Leaflet for the above study. The information has been fully explained to me and I have been able to ask questions, all of which have been answered to my satisfaction.	
I understand that this study is entirely voluntary, and if I decide that I do not want to take part, I can stop taking part in this study at any time without giving a reason. I understand that deciding not to take part will not affect my future access to my questionnaires and audio recordings until such time as they have been fully anonymised.	
I understand that I will not be paid for taking part in this study and that any resources i.e micro credential or implementation framework created during or as a result of this study will be made available under the creative commons licences. CC BY-NC-SA: This license allows re-users to distribute, remix, adapt and build upon the material in any medium or format for non-commercial purposes only and only so long as attribution is given to the creator. If they remix, adapt, or build upon the material, they must license the modified material under identical terms. CC BY-NC-SA includes the following elements: BY  – Credit must be given to the creator	

NC  – Only non-commercial uses of the work are permitted SA  – Adaptations must be shared under the same terms	
I agree to take part in this research study having been fully informed of the risks, benefits and alternatives which are set out in full in the information leaflet which I have been provided with.	
I know how to contact the research team if I need to.	
I agree to being contacted by researchers only through my Kerry ETB staff email address as part of this research study.	
I agree to take part in an audio recorded individual interview as part of this research study.	
I agree to take part in Community of Practice focus groups where anonymised observation notes will be made by the researcher.	
Data	Tick box
I understand that any identifiable information about me (personal data), will be anonymised and protected in accordance with the General Data Protection Regulation (GDPR).	
I understand that anonymous information from this study may be shared with third party academics worldwide for research and learning purposes.	
I understand that anonymous transcripts from my audio recordings will be retained by Trinity College Dublin for 7 years for use solely by Trinity College Dublin, and then destroyed.	
I understand that anonymous questionnaire results will be retained by Trinity College Dublin for 7 years for use solely by Trinity College Dublin, and then destroyed.	
I understand that under freedom of information legislation I am entitled to access the information I have provided at any time while it is in storage as specified above.	
Outcomes/Findings	Tick box
I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interviews which may reveal my identity or the identity of people I speak about.	
I understand that disguised extracts from my interview may be quoted in the Researchers PHD dissertation, conference presentation, published papers and books.	

Participant Name (Block Capitals)	Participant Signature	Date
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Participant Work Email Address

To be completed by the Principal Investigator or nominee.

I, the undersigned, have taken the time to fully explain to the above participant, the nature and purpose of this study in a way that they could understand. I have explained the risks and possible benefits involved. I have invited them to ask questions on any aspect of the study that concerned them.

I have given a copy of the information leaflet and consent form to the participant with contacts of the study team

Researcher Name:

Title and qualifications:

Email:

Signature of research participant

Signature of participant

Date

Signature of researcher

I believe the participant is giving informed consent to participate in this study.

Signature of researcher

Date

Appendix 14 Extracts from the Authors Reflexive Journal

Session One

Key areas suggested for PD by the Participants

-
1. Building teacher digital capacity
 2. Curriculum design lesson planning
-

P notes:

- There is a lot of focus on IT skills and tools as a means to make access easier.
 - Great to have the technology officer in these discussions to support me in identifying key technologies to look at.
 - Talk of inclusion of particular students not all students
 - A focus on students who struggle
 - Participants are quiet the main session room but seem to be more open in the breakout rooms.
 - Whiteboards are still new to a lot of people need to put some more resources up on how to use them.
 - OneNote note book resources well received and are being accessed
-

Session Four

- The introduction of the inbuilt accessibility tools in MS is new to a lot of participants
-

- Focus on using accessibility tools is still on students who struggle
-

- Introducing the concept of accessibility for all and using the tools for all students and letting them decide for themselves sparked a very lively conversation in the main room which was further explored in the breakout rooms.
 - Starting to really explore the idea of inclusive design being for all.
-

P notes

- Some very keen insights from the breakout rooms and the start of real sharing of practices.
 - More in-depth training needed on AT
-